REMARKS

1. This is Applicant's Response to the Office's communication dated 7/22/02 (cover as Exhibit A, attached). Applicant thanks Examiner Palabrica for the careful attention to detail accorded to the above-identified application.

2. Claims 1-10 and 12-19 remain in this application. Claims ,1,3,4,6,8,12, and have been amended. Claims 21 and 22 have been added, are were discussed explicitly in the original specification and claims, of which this application is the Continuation. There is no new matter or new material. The language is exactly that of the original specification and claims. There is no additional cost or fees since there are three independant claims and 20 total claims.

3. Applicant notes that Examiner Palabrica has not acknowledged that the Office has previously separated this Invention, as defined by Examiner Wasil, into several inventions. The identical original specification and drawings of Serial no. 07/760,970 have already gone through a restriction by the Primary Examiner Daniel Wasil on June 8, 1992. Mr. Wasil separated 07/760,970 into five inventions based upon accuracy and his wisdom and therefore Applicant notes that there is no abandonment of any of the other inventions. All rights are, and remain, reserved.

4. Applicant acknowledges, but respectfully disputes:

Several claims have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Claims 1-7, 10, and 13-16 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Westfall (US 5,215,631).

Claims 1-9 and 13-19 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Furuya (PTO98-0712).

Claims 1-8, and 13-16 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Patterson (Patterson (U.S. 5,318,675) [hereinafter referred to as Patterson-1]), or Patterson (U.S. 5,372,688) therinafter referred to as Patterson-2).

Claims 1-7 and 13-16 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Swartz (Swartz (Fusion Technology, Vol. 22, Sept. 1 992, pages 296-300) [herinafter referred to as Swartz-1], or Swartz (Transactions of Fusion Technology, Vol. 26, Dec. 1 994, pages 74-77) [hereinafter referred to as Swartz -2], or Swartz (Cold Fusion Source Book, International Symposium on Cold Fusion and Advanced Energy Sources, Belarusian State University, Minsk, Belarus, May 25-26, 1994) thereinafter referred to as Swartz-3).

Claims 1, 2, 4, 5, 7, 10, 13, 15 and 16 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella (U.S. 3,682~806).

Claims 10 and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya in view of either Lasche (US 4,735,762) or Wooley (US 5,991,351).Claims 1-10 and 12-19 stand rejected under 35 U.S.C. 112 by the Examiner, based upon flawed reference to other art ("FP" or "F+P").

Claims 1-10 and 12-19 are rejected under 35 U.S.C. 101 by the Examiner, based upon flawed reference to other art ("FP" or "F+P").

Applicant acknowledges, and has corrected, rejection of several claims under 112, second paragraph, as being indefinite.

5. The Office's Communication dated 7/22/02 is inconsistent with the Office's previous actions (infra) or those of the Federal Court. The Office's Communication dated 7/22/02 does not comply with several of the Office's rules. The Office's Communication dated 7/22/02 contains misstatements that are hereby corrected for the record.

Pursuant to In re Oetiker, Applicant hereby does respond in full to each of the Examiner's points with discussion in detail, below.

Pursuant to In re Morris, Applicant does respond with information including those skilled-in-the-art.

Pursuant to In re Grey, Applicant presents other evidence including those of operability and utility, including in said Declarations [thereby also consistent with In re Porter].

6. Supportive information is discussed in attached Declarations, and as discussed below, in references including those made in the "Declaration of Dr. Mitchell R. Swartz" (called "Swartz declaration"), the applicant herein. Also submitted, precisely relevant to this application, through that application from which this application is a Divisional, are the Declaration of Straus (4/22/94), and the Amicus Curiae Briefs of Drs. Edmund Storms (2/21/01), Talbot Chubb (2/221/01), Eugene Mallove (3/24/00) and Hal Fox (2/21/01). In the Swartz declaration, and in previous correspondence with the Office, the Declarant is shown to be qualified as an expert with respect to the subject matter of this application. In the other declarations, and in previous correspondence with the Office, the Declarants are shown to be qualified as an expert with respect to the subject matter of this application.

7. Applicant acknowledges receipt from the Examiner of 12 patents [A, through G, five foreign] and 21 additional references [undistinguished as U through X]. The Office's references will be discussed in detail below. Briefly, the Office's references include very old inaccurate papers, including the usual newspapers, and are nearly all from 1989. They are simply outdated, and at variance with knowledge at the time the present application was filed.

In response to the Office communication and the continued unfairness whereby the Office ignores over 300 publications which the Applicant has sent the Office, the Applicant therefore includes additional references consisting of articles taken from peer-reviewed journals. These references are only necessary to rebut the statements made by the Examiner [pursuant In re Grey, In re Oetiker], and are listed upon the accompanying Forms PTO-1440. They were not relevant until the Examiner made statements which are incorrect, and corrected herein by said art. Almost all precede the present application and show that the concepts objected to by the Office have been accepted in the scientific community through peer review publication at the time the patent was filed. Furthermore, because there has been a significant rebuttal to the the 35 USC 112 and 101 issues, the Applicant includes two responses from which the present application is a divisional. Said responses (re: '970, Amendment under Rule 116 (Nov. 2, 1993) and Reply Brief to Examiner's Answer (April 23, 1994), and the Appendix "Introduction to Barriers", demonstrate that this materials was sufficient for the previous Examiner, D. Wasil, and almost all of the issues were resolved.

8. Applicant acknowledges the Notice of Patent Drawing Objection. New drawings will be filed after allowance.

COMMENTS ON THE AMENDMENTS AND REMARKS

9. For the convenience of, and at the request of, the Examiner, the Amendments also appended.

In all cases of amendment, there is no new material added. The changes were only made in response to the comments of the Examiner, the wording and scope of the changes maintains the wording and scope of the original disclosure. The new claims and amendments are strictly composed of the language of the specifications and claims of the original disclosure. In each case, wording and scope of the addition maintains the wording and scope of the original disclosure.

10. Based upon the Examiner's comments the claims of record have been rewritten and amended as new claims 1-10, 12-19, 21 and 22 which fully and completely distinguish the invention over the cited references. These claims respectfully are submitted and are patentable over the cited references because:

i) the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and

ii) said physical distinction effects new and unexpected results, thereby indicating that said physical distinction is unobvious [Sec. 103].

'765 teaches a two-stage process involving loading of hydrogen into a metal electrode such as palladium, and extraction of product using an inhomogeneous magnetic field intensity. Applicant taught using a first stage of electrode loading, followed by, a second stage of sudden rapid ("catastrophic") flow of the loaded hydrogen within the metal. Applicant taught in the original specification and claims how this apparatus works and presented objective detailed evidence of the invention. The first stage is the electrode loading, and then, in the second stage a rapid ("catastrophic") flow of hydrogen results within the metal. After the initial loading, said flow (or flux) of hydrogen takes place (pages 15-16,19-22,28,33-34; S.N.07/760,970) until the previously-loaded palladium is spent of its deuterons or the material is otherwise damaged.

11. The invention at issue in this case, generally speaking, is a two-stage process involving loading of hydrogen into a specialized metal electrode such as palladium which has the unique property that it internally fills with hydrogen, as a sponge fills with water. The first stage is the electrode loading, and then, in the second stage a rapid ("catastrophic") flow of hydrogen results within the metal. In addition, without negating or demeaning any of the other benefits or aspects of the present invention, the original specification of the above-entitled application also taught, and the present invention improves, the removal of heat and other products. Each of these features has great utility.

The teachings, and Claims 1-10, 12-19, 21, and 22, involve, and the invention at issue in this case generally speaking is, a two-stage process involving hydrogen loading into a specialized metal electrode followed by internal flux (flow) within the metal. This two-stage system is as important and fundamental as the critical difference between burning gasoline and its controlled ignition within an internal combustion engine. After the initial loading, said flow (or flux) of hydrogen takes place (pages 15-16,19-22,28,33-34; S.N.07/760,970) until the previously-loaded palladium is spent of its deuterons or the material is otherwise damaged.

Barriers are used to strategically inhibit the flow (Appendix C; A55-A59). In the preferred embodiment, the cathode is surrounded in coaxial fashion by a deuteron diffusion barrier (labelled 50 in figure 7) and an expansion barrier (labelled 40). The cathode is axially-fed the deuterons. These are obvious features of great utility. As taught in the original specification, in the prefered embodiment, this two-stage process is housed in a structural support system (labelled 20).

The original specification and claims of the present invention also taught and claimed a separation system (Figure 18), to extract an precise product - another feature of great utility. A magnetic field inhomogeneity, based upon the differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21], creates forces which make this a

> **"non-linear device in the sense that the containment field distribution is spatially non-uniform. ... the ... invention is therefore a chemical collection device."**
>
> [Straus Declaration 1994]

ON PURPORTED NEW MATTER

12. The Examiner states,

"... the current application cannot claim priority of the filing date of the earlier application because of the above differences in the subject matter covered (e.g., electrochemical nuclear fusion product for the earlier application vs. electrochemical reaction product for the current application)."

THE TRUTH - There Is Not Now New Matter Added

The applicant acknowledges the Examiner's statement, and in response hereby removes those portions of the Amendment involving fuel cells. The remaining portions, involving hydrogen loading (i.e. storage) and nuclear fusion were discussed explicitly in the original specification, and in the application of which this application is the Continuation. Hydrogen loading and nuclear fusion are not new matter or new material, and the Offices and Board's responses prove this convincingly and explicitly. Hydrogen loading is what obviously occurs during loading because of conservation of mass. Electrochemistry is obviously used because of the aqueous solutions and applied electric field intensities, and as is consistent with the literature, including that cited, such as Uhlig, H.H., "Corrosion and Corrosion Control", Wiley (1971), Bockris, O'm, J., K.N. Reddy, "Modern Electrochemistry", Plenum Press (1970), Von Hippel, A. "Dielectric Materials and Applications", MIT Press, (1954); And Von Hippel, A., D.B. Knoll, W.B. Westphal, "Transfer Of Protons Through 'Pure' ICE Ih SINGLE CRYSTALS", J. Chem. Phys., 54, 134, (also 145), (1971). So that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specifications.

Because hydrogen loading and storage in palladium, and nuclear fusion, and other reactions were discussed in detail in the original specification of the present application. Therefore, pursuant to 35 U.S. 132 this amendment is proper because it does not introduce any new matter into the disclosure of the invention. The Applicant has corrected this pursuant to notification of the Examiner.

The Applicant disputes the addition of new matter and is willing to go back to the Federal Appellate Court in 00-1108 with the Examiner to determine exactly what they meant if the Examiner disputes this.

PURPORTED INDEFINITENESS

13. The Examiner states

"Claims 1-10 and 12-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are vague, indefinite end incomplete."

" ...the bodies of the independent claims fail to recite a specific step of producing said product, as well as a specific step of controlling said product"

" .."the active quantity" ... there is insufficient antecedent basis for this limitation in the claim."

"... (I)ndefiniteness in claim language is of semantic origin" [In re Hammack, 427 F.2d 1384 n.5, 166 USPQ 209 n.5 (CCPA 1970)] and indefiniteness is the opposite of definiteness. Applicant has fully complied with the definiteness requirement of the second paragraph of 35 U.S.C.§112. The original specification and claim adequately presented the claimed invention so that an artisan, or those skilled in the art, could practice it without undue experimentation [In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed.Cir.1988)].

Definiteness is a characteristic of a patent claim in which claim language makes the scope of the claim clear to a person skilled in the art to which the invention pertains [MPEP 2173, MPEP 2173.02, MPEP 2173.05(a)]). Pursuant, to MPEP 2173, Applicant claimed with particularity, and did point out and distinctly claim the invention. Applicant's claims are therefore definite because the claims are precise, clear, correct, and unambiguous to a person skilled-in-the-art and, therefore, there was definiteness because the specification did conclude claims particularly pointing out and distinctly claiming the subject matter.

Furthermore, the Applicant has corrected this pursuant to notification of the Examiner. There is definiteness because, pursuant to 707.07(d) the Examiner pointed out wherein the indefiniteness resided, and now the Applicant submits precise corrections which the Examiner suggested. Each and every one.

DEFINITENESS BECAUSE OF CITED ISSUES ADDRESSED

14. 35 U.S.C. 112, second paragraph requires the Examiner had to provide reasons why the terms in the claims and/or scope of the invention are unclear "in a positive and constructive way, so that minor problems can be identified and easily corrected, and so that the major effort is expended on more substantive issues." All definiteness issues are hereby addressed. If there are other issues, the Examiner is asked to with specificity and clarity further explain what the rejection is based on [Ex parte Ionescu, 222 USPQ 537, 539 (Bd. App. 1984)].

DEFINITENESS CORROBORATED DECLARATIONS

15. There is definiteness because, supplementing the detailed specification, the Applicant submits further corroboratory expert testimony [Ex parte Gray, 10 USPQ2d 1922, 1928 (Bd. Pat. App. & Inter. 1989)] including Declarations and Amicus Curiae Briefs --which must be reviewed carefully. The Examiner must accurately discuss the invention as it is actually taught in the original specification and claims. The claimed invention should be the focus of the definiteness requirement.

DEFINITENESS SUPPORTED BY THE CLAIMS

16. There is definiteness because the pending claims must be given the broadest reasonable interpretation consistent with the specification [In re Prater, 415 F.2d 1393, 162 USPQ 541 (CCPA 1969), also MPEP Section 2111 - Section 2111.01] and the specification stated the meaning of the terms in the claims [In re Zletz, 893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989)].

Furthermore, there is definiteness because pursuant to 2173.05(a) the meaning of every term used in the claims was apparent from the prior art, cited art, and from the specification and drawings at the time the application was filed.

There is definiteness because the claims must each be given the broadest reasonable interpretation consistent with that which one who is skilled-in-the-art would reach [In re Morris]. In this case, it is corroborated by both the Declarations, Amicus Briefs, and peer-reviewed publications.

There is definiteness because the mere fact that a term or phrase used in the claim has no antecedent basis in the specification disclosure does not mean, necessarily, that the term or phrase is indefinite.

There is definiteness because the preamble of claim 1 recites the purpose of the process, and the process steps are able to stand alone (MPEP 2111.02).

There is definiteness because pursuant to 2173.05(b) the fact that claim language may not have been precise cannot automatically render the claim indefinite under 35 U.S.C. 112, second paragraph [Seattle Box Co., v. Industrial Crating & Packing, Inc., 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984)].

There is definiteness because acceptability of the claim language depends on whether one of ordinary skill-in-the-art would understand what is claimed, and that is confirmed by the light of the specification, the Declarations, the Amicus Briefs, and the peer-reviewed publications [Ex parte Porter, 25 USPQ2d 1144, 1145 (Bd. Pat. App. & Inter. 1992)].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION - DEFINITENESS SUPPORTED BY PROBATIVE REFERENCE

17. There is definiteness because Applicant provided (and provides again), in addition to the detailed specification, corroboratory probative reference in the form of peer-reviewed publications [e.g. Swartz (1992), Swartz (1994A), Swartz (1994B), Swartz (1997A), Swartz (1997B), Swartz (1998A)] which prove understanding by one skilled in the art [Atmel Corp. v. Information Storage Devices Inc., Fed. Cir., No. 99-1082, 12/28/99].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION - DEFINITENESS PROVE BY OTHER REJECTIONS

18. Applicant notes to the Examiner that there had to have been definiteness because the Examiner could not have made the rejection under 35 U.S.C. 102 of claims over Furuya or Wooley, etc., had the invention truly been without definiteness. The fact that claim 1 was found by the examiner to be anticipated by Furuya, and the other cited Art, proves that the present invention obviously has definiteness.

The Claims Distinguish Over The References Under 35 U.S.C. l02 (b)

19. Claims 1-7, 10, and 13-16 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Westfall (US 5,215,631). The applicant notes that the application '970 -of which the present invention '765 is a continuation of- was filed 88 prior to Westfall (June 1st 1993). In addition it precedes the filing date of Westfall (Oct. 11th, 1991). Nonetheless *in arguendo*, the applicant will now discuss Westfall in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

20. The Office states that Westfall discloses,

"growing palladium, titanium and other metal crystals for 'cold fusion' electrodes (e.g., see column 1, lines 36+, column 2, lines 37+, and column 3, lines 32)"

THE TRUTH - Different Purposes. Westfall makes growing crystals at 4.2 feet per hour

US 5,215,631 discloses a process and an apparatus for growing large crystals by electrodeposition. 631, as discussed therein, grows enlarging metal crystals as shown in figures 2a through 2d, therein. 631's invention is to produce dendritic crystals and explicitly involves ribbon crystal and crystalline growth systems with growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22). In 631, the crystals grow to become freestanding single crystals of tin in its cubic and tetragonal forms. 631 uses said grown crystals to make photovoltaic cells, as discussed in column 13, lines 55 through 66.

Westfall's crystals, grown at 4.2 feet per hour, do not have the purpose, advanced technology, features, and advantages of the present invention. Unlike Westfall, '765 teaches a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. This is clearly shown in the Figures, and discussed, in the original specification of 765.

21. The Office states that Westfall discloses,

"electrolytic apparatus ... comprising a bath (4) between a working electrode 8 (where the crystal growth occurs) and a counter electrode (which replenishes the electrolytic solution's concentration of ions of the to-be-deposited material"

THE TRUTH - Different Inventions - Even Westfalls Electrode changes in Position

US 5,215,631 discloses a process and an apparatus for growing crystals by electrodeposition. The electrode keeps moving (unlike the present invention) at 4.2 feet per hour (column 36 lines 17 through 22). Westfall --as it claims-- is simply a process and an apparatus for growing crystals in linear growth rate (column 36 lines 17 through 22), useful for freestanding single crystals of tin in its cubic and tetragonal forms. Even the anode used in 631 is shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49) using "crucibles ... chosen ... to survive the corrosive nature of the molten salt baths" (column 32 lines 55 through 59). Westfall includes none of the features of the present invention.

By contrast, the present invention is not a a process and an apparatus for growing crystals by electrodeposition, but in the preferred embodiment, a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. 631 does not discuss loading. Furthermore there is no mention of internal flows within any part of 631.

Thus, the present invention is novel and not anticipated by the cited art, Westfall. Nowhere in Westfall, or in any combination of the Examiner's art, is any aspect of the features of '765.

22. The Office states that Westfall discloses,

"Table 1 lists metals that can be grown..."

THE TRUTH - Different Metals for Different Purposes with Different Loadings

Actually, US 5,215,631 discloses enlarging metal crystals as shown in figures 2a through 2d, therein with growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22; said enlarging metal crystals shown in figures 2a through 2d, therein). The anode used in 631 is the shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49).

In contrast, the original specification and claims of the present invention, '765 claims a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

The present invention uses hydrogen INSIDE a metal such as palladium for purposeful reasons, which are clearly different from the ions making large crystals quickly OUTSIDE the metal, such as described in Westfall. Attention is directed to the fact that in Westfall, unlike the present invention, there are enlarging metal crystals, ribbon crystalline growth systems, tin in its cubic and tetragonal forms, and crucibles using molten salt baths.

Westfall's invention, a process and an apparatus for growing crystals of tin in its cubic and tetragonal forms controls ions OUTSIDE of the enlarging metal crystals (figures 2a through 2d, therein). Westfall refers to saturation OUTSIDE of the metal crystal and is an entirely different teaching from the present invention. 631 does not even discuss loading into the material (underlined in Examiner's quote for emphasis). Furthermore there is no mention of internal flows within any part of 631. Thus, it cannot read on the present invention, a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

Corroborating this, Westfall admits that the apparatus of Westfall is no more than a means to a process and an apparatus for growing crystals by electrodeposition with rapid metal growth rates at 4.2 feet per hour (column 36 lines 17 through 22). Westfall admits it makes photovoltaic cells (column 13, lines 55 through 66). Westfall also admits that crucibles must be chosen which are able to survive corrosive molten salt baths (column 32 lines 55 through 59).

Therefore, the material of Applicant's invention, '765, does not read on Westfall's process and an apparatus for growing crystals by electrodeposition, as the Examiner suggests.

The apparatus described in Westfall has none of the properties of the apparatus described in the present invention.

This demonstrates they are different patents entirely with different uses, reasons, and methods.

Attention is directed to the fact that the following elements shown in Westfall are not present, or needed, or claimed in the present invention. Said unneeded

elements numbered in Westfall as bath (4, column 8, line 5), reference electrode (14), light source (18), stepping motor (22) and its mechanical connection to the cathode (8) are not needed in the present invention, as described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness.

23. The Office states that Westfall reads on,

"hydrogen is generated in an aqueous system (e.g. see column 9, lines 32+)"
"the hydrogen generated by Wesffall's aqueous solution and his 'material' reads on Wesffall's 'working electrode.'"

THE TRUTH -

The material of Applicant's invention, '765, does not read on Westfall's process as the Examiner suggests.

When hydrogen appears in Westfall it is to the air as gas (column 9, line 35 through 43, especially lines 39 referring to "bubbling"). This is different from that used in the present invention which is loaded as taught in '765 in the present invention's original specification and claims.

This "bubbling" of hydrogen in 631 is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims. Unlike the present invention, 631 does not discuss loading. Furthermore there is no mention of internal flows within any part of 631. Corroborating this, in the present invention, the hydrogen sought is that within the palladium, which is not even discussed in '631.

US 5,215,631 discloses a process and an apparatus for growing crystals by electrodeposition which 1) involves ions other than hydrogen, 2) and they are on the OUTSIDE of the metal. Unlike the present invention, 631 does not discuss loading. Furthermore there is no mention of internal flows within any part of 631. By contrast, the original specification and claims of the present invention, '765, claim a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

If the materials and elements used in Westfall, as suggested by the examiner, were to be used in the present invention, they would not function. Furthermore, if the present invention was used as discussed in Westfall, the materials of '765 would not even be functional. Temperatures required for 631 are such that,"*crucibles must be chosen which are able to survive the corrosive nature of the molten salt baths*" (column 32 lines 55 through 59). If the present invention, '765, was used as described in Westfall, it would not even work.

24. The Office states that Westfall discloses,

"Maximum saturation is maintained by the use of a (working electrode surface area)/(counter electrode surface area less than unity (e.g., see column 24, lines 30+)"

"are directed to 'means for loading the isotopic fuel into a material' and the apparatus claims to 'means to load the isotopic fuel into a material' and, not to the loading of the fuel into the material.' Therefore, the claim recitations as to: a) 'loading the isotopic fuel to saturate the material'; and b) 'creating thereby a catastrophic diffusion flux of said isotopic fuel within said material' are not limiting"

THE TRUTH - Different Locations of Flow

Actually, US 5,215,631 discloses growing enlarging metal crystals at impressive growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22), used to make freestanding single crystals of tin in its cubic and tetragonal forms which 631 then uses to make photovoltaic cells, as discussed in column 13, lines 55 through 66. Unlike the present invention, the anode used in 631 is the shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49).

Saturation in the present invention involves LOADING of the hydrogen INSIDE the metal. This has nothing to do with 631. The applicant thanks the Examiner for pointing this out since there is a possible point of confusion and the applicant will correct the claims accordingly with replacement of saturation with "full loading" which is not new material since it was mentioned in the original specification and claims.

25. The Office states that Westfall reads on,

"Westfall's process and apparatus read on applicant's process and apparatus claims, the same can be said regarding applicant's claim language of 'creating a catastrophic diffusion flux of said isotopic fuel in said material.'"

THE TRUTH -Catastrophic Flow differs from Electrochemical Throwing power

The material of Applicant's invention, '765, does not read on Westfall as the Examiner suggests. Westfall's enlarging metal crystals (figures 2a through 2d, therein) in ribbon crystal and crystalline growth systems have claims and teachings which are not the same as a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal, as discussed in the present invention's original specification and claims

26. The Office states that Westfall reads on,

"Westfall's aqueous solution contains ordinary water, which, in turn, has 0.016% heavy water content (see Etherington, Nuclear Engineering Handbook, p 8-27). This reads on the claim language regarding having deuterium in the isotopic fuel. Westfall inherently also has a means to remove the product, i.e., formed crystal. Again, applicant's claim language reads on such."

THE TRUTH -

The material of Applicant's invention, '765, does not read on Westfall's process and apparatus for growing crystals by electrodeposition, as the Examiner suggests. Westfall's product produces dendritic crystals with growth rates (deposition rates) of 4.2 feet per hour (column 36 lines 17 through 22) to make photovoltaic cells (column 13, lines 55 through 66).

Westfall's invention which is a process and an apparatus for growing crystals by electrodeposition is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims. Actually, '765 reads on a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

Therefore, the hydrogen which is OUTSIDE the crystal in Westfall, or producing hydrogen in Westfall, is different in purpose and use AS CLAIMED from the present invention. It is nonsense to consider Westfall's crystal growth being product removed through the growing metal crystal as the same as heat produced in

the present invention. The applicant thanks the Examiner for pointing this out since there is a possible point of confusion and the applicant will correct the claims accordingly as it was mentioned in the original specification and claims.

27. Claims 1-8, and 13-16 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Patterson (Patterson (U.S. 5,318,675) [hereinafter referred to as Patterson-1]), or Patterson (U.S. 5,372,688) therinafter referred to as Patterson-2). As discussed below, the Applicant demonstrates that said rejection is an error.

The applicant notes that the application '970 -of which the present invention '765 is a continuation of- was filed September 17, 1991, prior to Patterson-1,2. In addition it precedes the filing date of Patterson-1,2. Nonetheless *in arguendo*, the applicant will now discuss Patterson-1,2 in full detail to demonstrate that even if they were timely, they are not relevant to the present novel invention which is not anticipated by the cited art, Patterson-1,2. Nowhere in Patterson-1,2, or in any combination of the Examiner's art, are any aspect of the features of '765.

28. The Office states that Patterson discloses,

"Either one of Patterson-1 or Patterson-2 discloses in Fig. 2 an electrolytic cell (12) filled with a liquid electrolyte (59) of heavy water, and having electrodes 15 and 16."

THE TRUTH -

Actually, Patterson (U.S. 5,318,675) [hereinafter referred to as Patterson-1]), or Patterson (U.S. 5,372,688) therinafter referred to as Patterson-2 discloses an electrolytic cell consisting of cathodic beads located in a flow calorimetric system. Patterson's invention is a simple electrolytic cell consisting of beads and Patterson claims said rudimentary electrolytic cell filled with beads of mixed metals, arranged as cathodic beads, with the entire aggregation of beads then located in a flow calorimetric system. This is discussed in Patterson and Cravens 5,607,563 "System for Electrolysis", hereinafter Patterson-3.

Patterson uses a pump (18 in Patterson; column 3 line 11), reservoir (32; column 3 line 12), slide valve (22; column 3 line 24), second slide valve (30; column 3 line 25), test reservoir (34; column 3 line 26), inlet and outlet stoppers (54 and 56; column 3 line3 39-40), conductive palladium coated microsphere (36; column 3 line 54, and column 4 lines 41 through 60), a "condactive (sic) foraminous grid" (38; column 3 line 56).

Patterson strives for "electrolysis" as the titles, description and claims of Patterson 1, and 2 admit.

Patterson --as it claims-- is simply an electrolytic cell consisting of cathodic beads located in a flow calorimetric system. Patterson demonstrates the most rudimentary electrolytic cell and does not have the advanced technology, features, and advantages of the present invention. Patterson includes none of the features of the present invention. The methods described in Patterson are not the methods described in the present invention. The apparatus described in Patterson has none of the properties of the apparatus described in the present invention. Therefore, Patterson is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims.

By contrast, the present invention is not a simple electrolytic cell consisting of beads, but in the preferred embodiment, a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. This is the opposite of Patterson. In addition, by contrast, the present invention minimizes electrolysis, exactly the opposite of Patterson-1, 2, and 3.

If the present invention, '765, was used as described in Patterson, it would not even work.

This present invention is novel and not anticipated by Patterson 1 or 2 or 3.

PATTERSON ERROR - - VERTICAL CALORIMETRIC CALIBRATION ERROR

29. Patterson's calibration is a failure because Patterson ignores and missinterprets thermal bouyancy.

In Patterson-3, Table 1 reveals a fundamental error for Patterson which is a vertical flow system where Bernard instabilities resolve immediately.

Table 1 reveals that the delta-T (row 1, column 7) is - 0.3. This cannot be correct because warm water always rises.

PATTERSON ERROR - VERTICAL CALORMETRIC ERROR

30. Patterson's numbers are an error because Patterson ignores and missinterprets thermal bouyancy.

The Patterson microsphere-CETI system did not work at the superlative levels reported (ie. kilowatts). This was because it was designed to be a flawed vertical flow system [confer Swartz, M, "Potential for Positional Variation in Flow Calorimetric Systems", Journal of New Energy, 1, 126-130 (1996) and Swartz, M, "Improved Calculations Involving Energy Release Using a Bouyancy Transport Correction", Journal of New Energy, 1, 3, 219-221 (1996)].

There is a major potential error of vertical flow calorimetry - Bernard instability. Vertical low-flow calorimetry will give a false reading to anyone using it if Bernard instability [bouyancy factors] are ignored. Therefore, many scientists knowledgeable of the state-of-the-art prefer static calorimetry of uncalibrated vertical flow calorimetry such as Patterson uses.

In Patterson, the experimental setup is flawed in a way that diminishes its accuracy and utility. Simply put, Patterson ignores its dependance upon a vertical flow system and its magnification of the actual result when Bernard instability is not considered. Patterson's equation ignores the verical bouyancy flow errors. Corroborating this indelibly, in Patterson-3, Table 1 reveals that the delta-T (row 1, column 7) is - 0.3. This cannot be correct because warm water always rises. Patterson should have used the zero amount to correct the output to derive a semiquantitative derived value from the observed instead of magnifying the output.

With Patterson, the invention is simple and flawed, and there is a failure of adequate calibration in the initial studies as the cited patent, Patterson-3, reveals. The result is that Patterson's data is flawed. The mere plugging of numbers into a formula does not necessarily mean that the derived value is accurate unless the formula(e) applies to the experimental setup. This was discussed in Swartz, M, " Potential for Positional Variation in Flow Calorimetric Systems", Journal of New Energy, 1, 126-130 (1996) and Swartz, M, "Improved Calculations Involving Energy Release Using a Bouyancy Transport Correction", Journal of New Energy, 1, 3, 219-221 (1996). Patterson has inaccurate data because it missinterpreted the amount of heat because of thermal bouyancy and Patterson's error of omission of considering it in Patterson's vertical flow system. In Patterson, the mere plugging of numbers into a formula used in a flawed way diminishes its derived value and accuracy.

31. The Office states that Patterson discloses,

"A plurality of conductive microspheres (36) having a uniform outer palladium coating are positioned within the housing (14). See, for example, Patterson-1, column 3, lines 54+ and column 4, lines 21+."

THE TRUTH - ERROR 1 - Patterson ignores Gauss' Law

Actually, Patterson discloses an electrolytic cell consisting of agglomerated cathodic beads located in the center of a flow driven by a pump (18 in Patterson; column 3 line 11), using a reservoir (32; column 3 line 12). Examination of the electrostatics and electrodynamics of Patterson reveals that Gauss' Law was ignored in the flawed Patterson design because there will be no electric field intensity withing the out boundary of the conductive spheres (similar to a Faraday cage).

32. The Office states that Patterson reads on,

"Note that applicant's claim language of 'producing a change in the active quantity of isotopic fuel in material by a change in temperature of the material' reads on either Patterson-1's or Patterson-2's process of 'controlling the electroiyte temperature by changing the flow rate."

THE TRUTH - Patterson controlling flow rate to control temperature involves Patterson's temperature measurement vs. this Inventions Method

The material of Applicant's invention, '765, does not read on Patterson's a simple electrolytic cell consisting of beads, as the Examiner suggests.

Patterson discloses an electrolytic cell consisting of cathodic beads located in a flow calorimetric system. Patterson uses a pump (18 in Patterson; column 3 line 11), reservoir (32; column 3 line 12), slide valve (22; column 3 line 24), second slide valve (30; column 3 line 25), test reservoir (34; column 3 line 26), inlet and outlet stoppers (54 and 56; column 3 line3 39-40), conductive palladium coated microsphere (36; column 3 line 54, and column 4 lines 41 through 60), a "condactive (sic) foraminous grid" (38; column 3 line 56).

Patterson's invention is a simple electrolytic cell consisting of beads and Patterson claims said rudimentary electrolytic cell filled with beads of mixed metals, arranged as cathodic beads.

Patterson strives for "electrolysis" as the titles, description and claims of Patterson 1, and 2 admit.

33. The Office states that Patterson discloses,

"The cell is exercised by a first stage (see Figs 1 and 2), which Patterson-1 refers to as a 'loading stages' during which a relatively low level current (0.05 amps) is introduced across the electrodes 15 and 16."

"During the initial loading, the palladium surface of the microspheres (36) fully absorbs and combines with the hydrogen isotope, i.e., it becomes loaded. This loading takes about two hours under a current flow through the cell of about 0 05 amps (e.g., see column 6, lines 6+)."

THE TRUTH - - Patterson is fundamentally a 1 stage System without catastrophic flow

Patterson discloses an electrolytic cell consisting of cathodic beads located in a flow calorimetric system.

Patterson strives for "electrolysis" as the titles, description and claims of Patterson 1, and 2 admit.

34. The Office states that Patterson reads on,

"Not withstanding the above non-limiting clauses of the claims, note that since the Patterson-1 or Patterson-2 process and apparatus read on applicant's process and apparatus claims, the same can be said regarding applicant's claim language of 'creating a catastrophic diffusion flux of said isotopic fuel within said material."

THE TRUTH -Patterson does not involve creating a catastrophic diffusion flux

The material of Applicant's invention, '765, does not read on Patterson's a simple electrolytic cell consisting of beads, as the Examiner suggests. Patterson's invention which is a simple electrolytic cell consisting of beads is not the same as a two-stage process of the present invention's original specification and claims. Actually, '765 reads on a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

Patterson uses a pump (18 in Patterson; column 3 line 11), reservoir (32; column 3 line 12), slide valve (22; column 3 line 24), second slide valve (30; column 3 line 25), test reservoir (34; column 3 line 26), inlet and outlet stoppers (54 and 56; column 3 line3 39-40), conductive palladium coated microsphere (36; column 3 line 54, and column 4 lines 41 through 60), a "condactive (sic) foraminous grid" (38; column 3 line 56) which do not even exist in the present invention.

Patterson strives for "electrolysis" as the titles, description and claims of Patterson 1, and 2 admit. However, it is NOT desired in the present invention which is operated through control of the optimal operating points (infra).

35. The Office states that Patterson reads on,

"Note that the palladium-coated microspheres are immersed in the electrolyte and any change in the electrolyte temperature inherently changes the temperature of the material."

THE TRUTH - Controlling temperature of the electrolyte for flawed flow calorimetry is NOT the same as methodically controlling device temperature

The material of Applicant's invention, '765, does not read on Patterson's a simple electrolytic cell consisting of beads, as the Examiner suggests.

Controlling temperature of the electrolyte for flawed flow calorimetry is NOT the same as methodically controlling device temperature. Patterson's invention uses a flow calorimetric system. Patterson uses his pump (18 in Patterson; column 3 line 11), reservoir (32; column 3 line 12), slide valve (22; column 3 line 24), second slide valve (30; column 3 line 25), test reservoir (34; column 3 line 26), inlet and outlet stoppers (54 and 56; column 3 line3 39-40) to effect temperature for differeent purpose, and by different process than the present invention.

In Patterson, there is temperature is control through the flow rate of electrolyte through rudimentary beads. Corroborating this, Patterson admits that the temperature of the electrolyte is both monitored and controlled by increasing the flow rate of electrolyte (59) therethrough (see column 6, lines 1+).

Attention is directed to the fact that in Patterson, unlike the present invention, there is temperature is control through the flow rate of electrolyte as opposed to the catastrophic method covered int he present invention, and uses a simple two electrode system with rudimentary beads.

36. Claims 1-9 and 13-19 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Furuya (PTO98-0712). As discussed below, the Applicant demonstrates that said rejection is an error.

The applicant notes that the application '970 -of which the present invention '765 is a continuation- was filed September 17, 1991, prior to Furuya. In addition it precedes the filing date of Furuya (10/30/92). Nonetheless *in arguendo*, the applicant will now discuss Westfall in full detail to demonstrate that even if it was timely, it is not relevant to the present novel invention which is not anticipated by the cited art, Furuya. Nowhere in Furuya, or in any combination of the Examiner's art, is there any aspect of the features of '765.

37. Furuya (PTO98-0712) discloses a method to seal off deuterium using a surface barrier layer. In fact, Furuya demonstrates the most rudimentary of one stage loading and surface sealing method but it does not have the advanced technology, features, and advantages of the present invention. Attention is directed to the fact that in Furuya, unlike the present invention, there is only a one stage system, and only a single rudimentary surface barrier of a single type. Furuya admits that 'deuterium is not able to penetrate' (page 3) and notes that there is a Pd sheet 2, 'into which has been sealed deuterium' (page 8). Therefore, the apparatus of Furuya is no more than a means to one stage loading and surface sealing method.

In fact, attention is directed to the fact that Furuya leads away from the present invention as it uses ceramic packing (7, see page 10, and figure 2), gas expansion film (6), and electrolyte vat (1, see also figure 1), copper jig (8) and water passage (9) are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that Furuya leads away from the present invention because Furuya's barrier is formed "by an electrolytic plating method" (page 3) whereas in the present invention the barriers engineered as part of the method and apparatus.

Attention is also directed to the fact that Furuya leads away from the present invention because Furuya's goal is "electrolysis" (page 4) whereas the present application used the Q1D equations of loading to minimize electrolysis.

Finally, attention is directed to the fact that Furuya leads away from the present invention Furuya's system is not efficient as he described "a state where pressure is applied by air pressure to apply a temperature differential in the metal into which the deuterium has been adsorbed." (page 6).

The methods described in Furuya are not the methods described in the present invention because Furuya --as it claims-- is simply a method to seal off detuerium using a surface barrier layer. The apparatus described in Furuya has none of the features of the apparatus described in the present invention.

Unlike the Examiner's cited patent, Furuya, which is a one stage loading and surface sealing method, which uses methods well known to those who work in the art, the present application, in the preferred embodiment, is a novel and nonobvious two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

38. Attention is directed to the fact that the following elements shown in Furuya are not present, or needed, or claimed in the present invention. Said unneeded elements numbered in Furuya as ceramic packing (7, see page 10, and figure 2), gas expansion film (6), and electrolyte vat (1, see also figure 1), copper jig (8) and water passage (9) are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Furuya teaches a one-stage system. Swartz (07/371,937) goes further and teaches a two-stage system using an inhomogeneous magnetic field to extract product. The original specification of this application discussed the use of pressure and temperature to generate a sudden catastrophic desaturation of the deuterium loaded palladium, with even means to control the created intraelectrode deuteron fluxes, and in a third stage means to extract the desired products.

Nowhere in Furuya is taught the complexity and design of the complex systems specified and taught in the above-entitled application. Furuya teaches a much simpler device. The present application goes further to provide interlocking multiterminal systems. To compare Furuya's invention to the novel invention described in the above-entitled application [attention is directed to Figure 18] is like comparing a wire-("cat-whisker")-galena junction to a hybrid integrated circuit. As a result, this application is more complicated, new in many ways, and nonobvious.

In summary, the complexity of the novel improvements taught in the above-entitled application far exceeds Furuya and the other cited Art by the Examiner.

39. The Office states that Furuya discloses,

"in Fig. 1 a negative electrode of palladium sheet (2) that is submerged in an electrolyte (1) containing heavy water (see page 7+ of the English language translation). A positive electrode of platinum wire (4) is wound around the palladium sheet. Deuterium is then absorbed ('loaded') into the palladium by applying a voltage between the electrodes. HO ions are then added to the electrolyte and a barrier to prevent escape of the loaded deuterium is created on the surface of the palladium sheet by electrolytic plating."

THE TRUTH - FURUYA USES DIFFERENT POWER SOURCE, ROLE OF ELECTROLYSIS

PTO98-0712 discloses a method to seal off detuerium using a surface barrier layer. The material of Applicant's invention, '765, does not read on Furuya's one stage loading and surface sealing method, as the Examiner suggests. Furthermore, the present invention cites the applicant's earlier filings and different electrolytes and methods to drive (electrical current source, Norton equivalent) was taught.

Furuya's invention which is one stage loading and surface sealing method, and is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims. '765 specifically reads on a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

If the present invention was used as discussed in Furuya, it would not be functional. For example, Furuya's goal is "electrolysis" (page 4) whereas the present application used the Q1D equations of loading to minimize electrolysis.

40. The Office states that Furuya discloses,

"in Fig. 2 the use of the said deuterium-ioaded palladium sheet with a barrier surface in purportedly producing cold nuclear fusion. The palladium sheet (2) is placed between ceramic packing (7). While pressure is applied between two copper jigs (8 and 8'), cold water is allowed to flow into the opening in the first copper jig (8) to cool the material. The other jig (8') is heated with a heater (1 0). A localized concentration of deuterium atoms is created when a temperature differential is developed across the palladium sheet (2). Cold nuclear fusion is claimed and excessive heat is purportedly observable (e.g., see paragraph 009 on pages 8 and 9)."

THE TRUTH - FURUYA IS RUDIMENTARY AT BEST

Actually, PTO98-0712 is only a one stage system, and only a single rudimentary surface barrier of a single type. The Examiner must have not interpreted this correctly because attention is directed to the fact that Furuya uses ceramic packing (7, see page 10, and figure 2), gas expansion film (6), and electrolyte vat (1, see also figure 1), copper jig (8) and water passage (9) are not needed in the present invention.

Attention is directed to the fact that Furuya is not efficient as he described "a state where pressure is applied by air pressure to apply a temperature differential in the metal into which the deuterium has been adsorbed." (page 6).

The methods described in Furuya are not the methods described in the present invention. The apparatus described in Furuya has none of the features of the apparatus described in the present invention.

41. The Office states that Furuya reads on,

"Note in also Fig. 2 that the palladium sheet (2) shows at least two sides that must be plated with barrier layers to seal the loaded deuterium within the sheet. This arrangement reads on the claim language 'diffusion barriers are multiple and are arranged as alternating layers of diffusion barriers.'"

THE TRUTH -TWO BARRIERS HAVE FOUR SIDES

The material of Applicant's invention, '765, does not read on Furuya's one stage loading and surface sealing method, as the Examiner suggests nor on the cited configuration.

Ignoring for the moment that Furuya's invention which is one stage loading and surface sealing method is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims, attention is directed to the fact that Furuya leads away from the present invention because Furuya's barrier is formed "by an electrolytic plating method" (page 3) whereas in the present invention the barriers engineered as part of the method and apparatus.

Furthermore, two sides of a single barrier is different from multiple [ie. more than one] barrier, where there would be at least four sides.

The configuration described in Furuya is not the configuration described in the present invention.

42. The Office states that Furuya discloses,

"The deuterium-absorbing metal is used a negative electrode can be a palladium alloy. A barrier layer that deuterium will not penetrate is formed on the surface of the negative electrode (e.g., see page 5, paragraph 0005)."

THE TRUTH -LOCATION OF BARRIER IS DIFFERENT

PTO98-0712 discloses a method to seal off detuerium using a surface barrier layer at the location cited by the Examiner. This is different in location, function, and purpose from the barrier described in the present invention, where it is not at the surface, but at 90 degrees to the loading surface.

43. Claims 1, 2, 4, 5, 7, 10, 13, 15 and 16 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella (U.S. 3,682, 806). As discussed below, the Applicant demonstrates that said rejection is an error.

Kinsella --as it claims-- is simply a process for electroplating metallic articles with carboxylic film-forming materials in a process utilizing lithium hydroxide as solubilizer (see Fig. 1 and column 8, 2nd paragraph). Kinsella demonstrates the most rudimentary of an electroplating process and it does not have the purpose, advanced technology, features, and advantages of the present invention.

Kinsella, uses a stainless steel cathode, and only a one stage process. Kinsella uses no loading, or has no features of the present application. Corroborating this, from Kinsella, the Examiner quotes that 'Fig. 1 shows the anode (4), which is the material to be coated, a stainless steel cathode (6)'. Furthermore, as additional further proof in Kinsella the text explicitly states, as the Examiner quotes 'An alternative embodiment can have an auxiliary platinum anode (7) and an auxiliary stainless steel cathode (8)'.

Kinsella leads away from the present invention as it uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11), which are not needed in the present invention, as described in the original specification and claims.

In addition, Kinsella, (page 2, column 2, lines 7-15) teaches the loading current is into the volume of the cathode (in contrast to the cited patent).

Thus, the present invention, unlike Kinsella which uses methods well known to those who work in the art, is not an electroplating process of carboxylic film-forming materials, but in the preferred embodiment is a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. The present invention uses a two-stage process, loading of hydrogen, a metal electrode such as palladium, a first stage of electrode loading, and a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal, for purposeful reasons, which are clearly different from the carboxylic film-forming processes described in Kinsella.

Corroborating this, attention is directed to the fact that the following elements shown in Kinsella are not present, or needed, or claimed in the present invention. Said unneeded elements numbered in Kinsella as 1 (cationic membrane to divide the cathodic compartment (column 9 line 65), 7 (a auxiliary platinum anode (column 10 line 15),9 (a selective electrodialysis membrane to contain ion exchange resin (column 10 lines 19-23), and 11 (a solubilized feed makeup material introduced to the anode (column 10 line 11) are not needed in the present invention, as the described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness.

If the materials and elements used in Kinsella, here the cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11), as suggested by the examiner, were to be used in the present invention, they would not function. Similarly, if the

present invention, '765, was used as described in Kinsella, it would not be functional.

The present invention is novel and not anticipated by Kinsella. Nowhere in Kinsella is any aspect of the features of '765.

The materials described in Kinsella do not have the properties of the materials described in the present invention.

The methods described in Kinsella are not the methods described in the present invention.

44. The Office states,

"The 'electrodeposition current' flows from the anode (4) to the stainless steel cathode (6)."

THE TRUTH - The Examiner's Current Analogies are Not Accurate

It is improper to compare Kinsella's 'electrodeposition current' to the present invention's well taught loading current.

In Kinsella, the loading current is onto the surface of the cathode in contrast to the cited patent which loads the volume for different purpose.

Kinsella electroplates metallic articles with carboxylic films (column 8, 2nd paragraph).

Unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, in Kinsella, there is only a stainless steel cathode. Corroborating this, from Kinsella, the Examiner quotes that 'Fig. 1 shows the anode (4), which is the material to be coated, a stainless steel cathode (6)'. Furthermore, as additional further proof in Kinsella the text explicitly states, as the Examiner quotes 'An alternative embodiment can have an auxiliary platinum anode (7) and an auxiliary stainless steel cathode (8)'.

Further corroborating this, attention is directed to the fact that Kinsella leads away from the present invention as it uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11) which are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that in Kinsella, unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, in

Kinsella, there is only a stainless steel cathode, only a one stage process, no loading, and no features of the present application.

Even the currents are handled differently. Kinsella, (page 2, column 2, lines 7-15) teaches the loading current is into the volume of the cathode in contrast to the cited paten (infra).

45. The Office states that Kinsella discloses,

"An auxiliary direct current (referred to as 'regeneration current') is applied the auxiliary electrodes, the direction of the current being orthogonal to the direction of the electrodeposition current (see column 9, lines 65+)"

THE TRUTH -Regeneration Current Outside A Metal Has Nothing To Do With Catastrophic Flow Current Within A Metal

'765 teaches and claims a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

Kinsella's process is for the purpose of electroplating metallic articles with carboxylic films.

Attention is directed to the fact that Kinsella uses an auxiliary platinum anode ("7", column 10 line 15) which is not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

46. The Office states that Kinsella reads on,

"Note that applicant's 'isotopic fuel' in the claim language reads on Kinsella et OH's lithium anions that form on the anode, 'material' reads on 'anode', 'loading of isotopic fuel into material' reads on the 'electrodeposition current' and its effect 'change in the active quantity of isotopic fuel within material' reads on the 'regeneration current' and its effect"

THE TRUTH - Electrodeposition Current Is Not The Loading Current

The material of Applicant's invention, '765, does not read on Kinsella's an electroplating process carboxylic film-forming materials, as the Examiner suggests.

Kinsella's invention which is an electroplating process carboxylic film-forming materials which cannot be the same as a two-stage process involving loading of hydrogen into palladium.

Kinsella --as it claims-- processes carboxylic film-forming materials with lithium hydroxide as solubilizer (see Fig. 1 and column 8, 2nd paragraph). This

cannot read on the hydrogen of the present patent because the applicant uses hydrogen as the loaded material.

In addition, the 'anode' of Kinsella cannot be the 'material' because in the present patent, it is cathodically controlled and used for a different purpose.

The 'electrodeposition current' cannot read on 'loading of isotopic fuel into material' because in Kinsella, unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, there is only a stainless steel cathode (6). Furthermore, Kinsella uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11) which are not needed in the present invention, or used therein for the purposes which Kinsella states. This proves that the present invention has significant novelty and non-obviousness.

Kinsella's invention which is an electroplating process carboxylic film-forming materials is not the same as a two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims. '765 reads on a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

47. Claims 1-7 and 13-16 have been rejected under 35 U.S.C. l02 (b) as being anticipated by Swartz (Swartz (Fusion Technology, Vol. 22, Sept. 1 992, pages 296-300) [hereinafter referred to as Swartz-1], or Swartz (Transactions of Fusion Technology, Vol. 26, Dec. 1 994, pages 74-77) [hereinafter referred to as Swartz -2], or Swartz (Cold Fusion Source Book, International Symposium on Cold Fusion and Advanced Energy Sources, Belarusian State University, Minsk, Belarus, May 25-26, 1994) hereinafter referred to as Swartz-3). As discussed below, the Applicant demonstrates that said rejection is an error.

The applicant notes that the application '970 -of which the present invention '765 is a continuation of- was filed September 17, 1991, prior to Swartz 1, 2, and 3.

Nonetheless *in arguendo*, the applicant will now discuss Swartz 1,2, and 3 in full detail to demonstrate that the present novel invention goes far beyond them.

48. Swartz-1, 2, and 3 teach the background mathematics regarding the present invention. They discuss said mathematics to construct and develop the theoretical background by developing equations into understanding of the electrical forces and dynamic fluxes which operate during electrochemical loading of deuterium into a palladium metal cathode using an applied electric field. Said theoretical electrochemical loading theory is not the same as a detailed two-stage process involving loading of hydrogen into palladium discussed in the present invention's original specification and claims with extraction techniques for products taught therein.

Nowhere in Swartz 1,2, and 3 are the features of '765 such as extraction techniques for products as taught regarding Figure 18. They do not have the advanced technology, features, and advantages of the present invention.

By contrast, the present invention is not a theoretical electrochemical loading theory, but is the preferred embodiment, a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. This present invention is novel and not anticipated by Swartz 1, 2, 3.

LAW

49. In particular, as to Section 102 rejections, it is stated in M.P.E.P. 706.2 that:

> **'The distinction between rejections based on 35 USC 102 and those based on 35 USC 103 should be kept in mind. Under the former, the claim is anticipated (emphasis added) by the reference.**

Thus, the present invention, a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal, is novel, not obvious, and does distinguish from all previous art.

In this same connection, The Court of Customs and Patent Appeals said in In re Arkely, Eardley and Long, 172 U.S.P.Q. 524, 526 (CCPA, 1972):

> **'It is to be noted that rejections under 35 USC 103 are proper where the subject matter claimed 'is not identically disclosed or described'(emphasis by the Court) 'in the prior art,' indicating that rejections under 35 USC 102 are proper only when the claimed subject matter is identically disclosed or described in 'the prior art'.**

Therefore, given the above, the independent claims, and hence all claims, distinguish over the reference cited under Sec. 102 because they recite a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal.

Given the above, reconsideration with respect to novelty (Sec. 102) is respectfully requested by the Applicant.

The Novel Physical Features of the Claims Provide New and Unexpected Results and Should be Considered Unobvious Making the Claims Patentable Under Sec. 103

Claim Rejections - 35 USC § 103

50. Claims 10 and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya in view of either Lasche (US 4,735,762) or Wooley (US 5,991,351). As discussed below, the Applicant demonstrates that said rejection is an error. The claims of Applicant's invention, '765, do not read on Furuya with Lasche or Wooley, as the Examiner suggests.

BACKGROUND: Furuya

51. The Office states,

"*Furoya discloses the applicant's claims except for the removal of the product and the use of magnetic fields for said removal*"

THE TRUTH - Furuya is markedly different from the present invention

Actually, Furuya (US 5,215,631) is invention for producing heat from loaded palladium using the simple technique of F+P modified by a surface layer. It works basically by a one stage loading and surface sealing method which does not have sufficient features to produce reproducible reactions.

Attention is again directed to the fact that in Furuya, unlike the present invention, there is only a one stage system, and only a single rudimentary surface barrier of a single type. Furuya admits that 'deuterium is not able to penetrate' (page 3) and notes that there is a Pd sheet 2, 'into which has been sealed deuterium' (page 8). Therefore, the apparatus of Furuya is no more than a means to one stage loading and surface sealing method. Furuya leads away from the present invention as it uses ceramic packing (7, see page 10, and figure 2), gas expansion film (6), and electrolyte vat (1, see also figure 1), copper jig (8) and water passage (9), and a barrier is formed "by an electrolytic plating method" (page 3) whereas in the present invention the barriers engineered as part of the method and apparatus.

Furuya leads away from the present invention because Furuya's goal is "electrolysis" (page 4) whereas the present application used the Q1D equations of loading to minimize electrolysis. The apparatus described in Furuya has none of the features of the apparatus described in the present invention.

BACKGROUND: Lasche (US 4,735,762)

52. Lasche (US 4,735,762) is invention for generating electric power using liquid lithium which is laser or charge particle beam driven using work against an applied magnetic field. It works basically by use of a magnetic field for producing electric energy directly from a nuclear fusion device.

In fact, attention is directed to the fact that Lasche leads away from the present invention as it uses liquid lithium or compact blanket (22, see column 6, line 56), lithium beam tube (24, see column 6, line 59), liquid lithium configured into a sphere (32, see column 7, lines 15-18), two quarter-spheres which rotate into a column of liquid lithium (48, column 7, lines 33-36), sphere formed from two quarter-spheres which rotate into a column of liquid lithium (32, column 7, lines 33-36), tube of solid lithium (32, column 7, lines 43-46), suspension cables (43, column 10, lines 48-53), retractable expansion clamp (41, column 10, line 5-10), and the requisite housing (27) and clamping mechanism (37), etc., which are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Lasche (US 4,735,762) uses external MHD generators (58 in FIgure 2, column 16 lines 36-59) and admits the reactions goes as v x B (column 21, lines 28-33).

Lasche does not have any of the features of the present invention.

BACKGROUND: Wooley (US 5,991,351)

53. Wooley (US 5,991,351) is invention for generating electric power using hot liquid metal moving through a magnetic field generating magnetohydrodynamic power. It works basically by use of a magnetic field for producing electric energy directly from a nuclear fusion device.

In fact, attention is directed to the fact that Wooley leads away from the present invention as it uses DT fueled thermocnuclear reactor (10, column 5, lines 18-22), a plurality of axissymmetric poloidal field electromagnetic coils (16, column 5, lines 25-28), thermonuclear DT plasma neutron source (18, column 6, lines 10-12), liquid metal blanket (20, column 6, lines 14-16), MHD pump duct (32, column 6, lines 24-25), MHD generator duct (70, column 8, lines 14-15), high-pressure mixer (46, column 6, lines 48-49), gas pump (52, column 6, lines 54-59), etc., which are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Wooley uses external MHD generators and admits the reactions goes as v x B (column 8 lines 1-7).

Wooley does not have any of the features of the present invention.

54. The apparatus described in Lasche and Wooley have none of the properties of the apparatus described in the present invention.

The materials described in Lasche and Wooley have none of the properties of the materials described in the present invention.

The methods described in Lasche and Wooley are not the methods described in the present invention.

This present invention is novel and not anticipated by the cited art, Furuya, Lasche and Wooley. Nowhere in Furuya, Lasche and Wooley, or in any combination of the Examiner's art, is any aspect of the features of '765.

The present invention, "765 involves the solid state and not plasma physics.

Even the way the magnetic fields used are different.

Furthermore, in the present invention, additional techniques are used and features exist, unlike Lasche and Wooley.

Lasche and Wooley include none of the features of the present invention.

Wooley discloses the use of a magnetic field for producing electric energy directly from a nuclear fusion device, involving the action of said field on the charge particle product of fusion.

55. Attention is directed to the fact that the following elements shown in Lasche are not present, or needed, or claimed in the present invention. Lasche uses liquid lithium or compact blanket (22, see column 6, line 56), lithium beam tube (24, see column 6, line 59), liquid lithium configured into a sphere (32, see column 7, lines 15-18), two quarter-spheres which rotate into a column of liquid lithium (48, column 7, lines 33-36), sphere formed from two quarter-spheres which rotate into a column of liquid lithium (32, column 7, lines 33-36), tube of solid lithium (32, column 7, lines 43-46), suspension cables (43, column 10, lines 48-53), retractable expansion clamp (41, column 10, line 5-10), and the requisite housing (27) and clamping mechanism (37), etc., which are not needed in the present invention. Lasche (US 4,735,762) uses external MHD generators (58 in FIgure 2, column 16 lines 36-59) and admits the reactions goes as v x B (column 21, lines 28-33). Said unneeded

elements numbered in Lasche are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that the following elements shown in Wooley are not present, or needed, or claimed in the present invention. Wooley uses a DT fueled thermocnuclear reactor (10, column 5, lines 18-22), a plurality of axissymmetric poloidal field electromagnetic coils (16, column 5, lines 25-28), thermonuclear DT plasma neutron source (18, column 6, lines 10-12), liquid metal blanket (20, column 6, lines 14-16), MHD pump duct (32, column 6, lines 24-25), MHD generator duct (70, column 8, lines 14-15), high-pressure mixer (46, column 6, lines 48-49), gas pump (52, column 6, lines 54-59), etc., which are not needed in the present invention, as the described in the original specification and claims. Wooley uses external MHD generators and admits the reactions goes as v x B (column 8 lines 1-7). Said unneeded elements numbered in Wooley are not needed in the present invention, as the described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness.

56. If the present invention, '765, was used as described in Lasche, it would not even work.

If the materials and elements used in Lasche, here the liquid lithium or compact blanket (22, see column 6, line 56), lithium beam tube (24, see column 6, line 59), liquid lithium configured into a sphere (32, see column 7, lines 15-18), two quarter-spheres which rotate into a column of liquid lithium (48, column 7, lines 33-36), sphere formed from two quarter-spheres which rotate into a column of liquid lithium (32, column 7, lines 33-36), tube of solid lithium (32, column 7, lines 43-46), etc., as suggested by the examiner, were to be used in the present invention, they would not function.

If the present invention, '765, was used as described in Wooley, it would not even work. If the materials and elements used in Wooley, here the DT fueled thermocnuclear reactor (10, column 5, lines 18-22), a plurality of axissymmetric poloidal field electromagnetic coils (16, column 5, lines 25-28), thermonuclear DT plasma neutron source (18, column 6, lines 10-12), liquid metal blanket (20, column 6, lines 14-16), MHD pump duct (32, column 6, lines 24-25), MHD generator duct (70, column 8, lines 14-15), high-pressure mixer (46, column 6, lines 48-49), gas pump (52, column 6, lines 54-59), etc., as suggested by the examiner, were to be used in the present invention, they would not function.

This present invention has which has nothing to do with Lasche's liquid lithium, compact blanket, lithium beam tube, liquid lithium configured into a sphere (32, column 7, lines 15-18), column of liquid lithium (48, column 7, lines 33-36), or tube of solid lithium (32, column 7, lines 43-46), etc., nor MHD generators using reactions which go as v x B, which the Examiner suggests because in Lasche the invention involves thermonuclear reactors and molten metals at extremely high temperatures whereas in the present invention the temperatures are such that kB*T is ~ a fraction of a volt.

This present invention has which has nothing to do with Wooley's DT fueled thermocnuclear reactors, axissymmetric poloidal field electromagnetic coils, thermonuclear DT plasma neutron sources, liquid metal blankets, MHD pump ducts or generator ducts, nor MHD generators using reactions which go as v x B, which the Examiner suggests because in Wooley the invention involves thermonuclear reactors and molten metals at extremely high temperatures whereas in the present invention the temperatures are such that kB*T is ~ a fraction of a volt.

57. The Office states that,

"One having ordinary skill in the art would have recognized that the fusion apparatus of Furuya produces the same charged particle products as those produced by either one of Lasche or Wooley, and the use of a magnetic field to remove the fusion products in Furuya's would have been prima facie obvious."

THE TRUTH - DIFFERENT TYPES OF MAGNETIC FIELD FORCES USED

First, Furuya does not produce charge particles, but in arguendo, even supposing that it did, neither Lasche or Woolsey are even remotely like, or have the same methods of, or configuration of, or have the same purpose of, the present invention. Most importantly, the present invention separate a product but attention is directed to the fact that Lasche and Wooley use an entirely different and distinguishable principle.

Lasche and Wooley demonstrate the most rudimentary of use of a magnetic field for producing electric energy directly from thermonuclear reactors by way of a magnetohydrodynamic system, as is well-known. The magnetic field generates an electrical current orthogonal to charged particle trajectories by means of a magnet. This occurs when a moving charged particle experiences Lorentz force, which includes the cross-product force (v x μ H). Corroborating this, Lasche works basically by use of a magnetic field for producing electric energy directly from a

nuclear fusion device involving a liquid lithium or compact blanket (22, column 6, line 56), and lithium tube (24), sphere (32), column (48), and tube of solid lithium (32), held with suspension cables (43), retractable expansion clamps (41) and mechanism (37). Lasche does this using external MHD generators (58 in Figure 2, column 16 lines 36-59) and Lasche admits the reactions goes as v x B (column 21, lines 28-33). Wooley works basically by use of a DT fueled thermocnuclear reactor (10, column 5, lines 18-22), a plurality of axissymmetric poloidal field electromagnetic coils (16, column 5, lines 25-28), thermonuclear DT plasma neutron source (18, column 6, lines 10-12), liquid metal blanket (20, column 6, lines 14-16), MHD pump duct (32, column 6, lines 24-25), MHD generator duct (70, column 8, lines 14-15), high-pressure mixer (46, column 6, lines 48-49), and gas pump (52, column 6, lines 54-59).

Also, Lasche and Wooley require temperatures at which lithium liquifies and plasmas are formed, which is entirely different and distinguishable principle from the above-entitled application.

Lasche and Wooley use an entirely different and distinguishable principle from the above-entitled application which involves the use of a magnetic field intensity differently from Lasche and Wooley (which use a magnetic field intensity in a magnetohydrodynamic system, as is well-known). By contrast, '765 teaches an extraction proceedure using an inhomogeneous magnetic field intensity which has forces which goes as (μ H) *(μ H), and not (v x μ H) as taught in Lasche and Wooley.

58. The Examiner states,

"On page 32, lines 4+, the applicant discloses that the products are removed at the product barrier. However, there is neither an adequate description nor enabling disclosure of how and in what manner said products are so removed."

PUMPING ACTION BY A SPATIALLY INHOMOGENOUS MAGNETIC FIELD

As specified in the original disclosure: The pumping action upon products [other than heat] is from the action of an applied force exerted upon said product (in this case an isotope of hydrogen: tritium). The generation, and calculation, of the force induced by an applied magnetic field intensity upon the desired isotope which is generated within the CAM reactor, is derived as follows.

"An <u>inhomogenous magnetic field intensity</u> is applied by coil labelled 300 to one portion of the cathode (1). Said magnetic field is driven by the

power supply (labelled 301) in the figure. The spatially inhomogenous magnetic field could also be created by a superconductor."

[07/760,970; the present application in Continuation; Underline added for emphasis]

Ampere's Law is used to calculate the line integral of the magnetic field intensity around the applied electric current. That magnetic field intensity exists mainly in the gap between the high permeability rod (around which the coil has been wound) and includes the volumes encompassing the desired isotope [cf. Figure 18 of the original specification].

"The differential magnetic susceptibility between isotopic fuel and the nuclear fusion product is used to magnetically pump the product to and through the barrier labelled 350. At that location there is a buildup of the isotope with the larger magnetic susceptibility due to said differential magnetic susceptibility."

[07/760,970; the present application in Continuation]

The magnetic field intensity can be derived by inspection in the gap region based upon Gauss' Law, which implies that the divergence of the magnetic flux density is zero. Therefore, the use of a volume with one surface abutting the volume containing the desired isotope and the other surface abutting the end of said rod, results in a ratio between the two magnetic fields.

The magnetic field as taught in the above-entitled application is spatially inhomogeneous. The important result, as stated in the original specification, is that energy of the entire system decreases by the movement of the higher susceptibility isotopes towards, and into, the region containing the greatest magnetic field intensity.

59. The magnetic force, resulting from the applied magnetic field, is the spatial derivative of the magnetic coenergy with respect to distance.

"The magnetic force resulting from the applied magnetic field is the derivative of the magnetic coenergy with respect to distance in the axial direction, and is proportional to the square of the current, the square of the number of turns in the coil (300), and said differential magnetic susceptibility. The products are removed at the product barrier (labelled 350). If said isotopic product is of lower magnetic susceptibility, then the coil is moved toward the portion of the cathode near to the solution (6)."

[07/760,970; the present application in Continuation]

As an alternative means of calculating the applied magnetic force upon the desired isotope is to use the Maxwell Stress Tensor. The Maxwell Stress Tensor is

based upon the orthogonal, and parallel, components of the magnetic field intensity over the surface of the desired isotope. The stress tensor is quite complex. The calculated force is based upon the spatial divergence of the stress tensor. Both methods of deriving the magnetic force are identical. These solutions are extremely complex but an introduction to this physics in a far simpler system [as regards ferrofluids and not the more complicated invention and products of the above-entitled application] is available in "Electromechanical Dynamics", Part III, Elastic and Fluid Media, H. Woodson, J. Melcher, J. Wiley & Sons, Inc., NY (1968), pages 772 to 777 [cf. figures 12.2.21 and 12.2.24].

The equations of the above-entitled application are more complex because they include the differential isotope solubilities, the range of susceptibilities of the materials and products involved, which have parameters which vary with temperature. The present invention goes much further than either, or other cited art, with claims that clearly distinguish the invention.

60. In summary, Furuya, and Westfall, and Kinsella and Patterson and Lasche and Wooley are different and distinguishable from applicant's claims and have none of the features of the present invention. The present invention extracts differently than Lasche or Wooley (supra) and are different and distinguishable from applicant's claims and have none of the features of the present invention. Corroborating this, attention is now directed to the fact that in when the present invention separates product, attention is directed to the fact that with MHD the separation is outside of the site of the reactions, which is quite different from this application where an inhomogeneous applied magnetic field intensity is used within the system to extract product. Lasche and Wooley do not have the advanced technology, features, and advantages of the present invention.

This present invention is novel and not anticipated by the cited art, Wooley. Nowhere in Wooley, Lasche, Furuya, Westfall, Kinsella, Patterson, or in any combination of the Examiner's cited art, is any aspect of the features of '765. Thus, the material of Applicant's invention, '765, does not read on Furuya with Lasche or Wooley, as the Examiner suggests, and therefore, the present application is a novel and nonobvious.

LAW

61. With respect to evaluation of claims under 35 U.S.C. 103, 'every portion of the ... claims must be considered in determining ... obviousness' [emphasis added; In re Duva, 156 USPQ 90, 94 (CCPA 1967)]. The Court, in reversing the Office in In re Kuderna and Phillips, 165 USPQ 575, 578- (CCPA 1970), referred to the 'sum of the relevant teaching in the art, ' pointing out that the Office is not allowed to 'view ... first one and then another of isolated teachings' when determining that 'the subject matter as a whole would have been obvious at the time the invention was made', as required by 35 U.S.C. 103. Particularly pertinent is In re Shuman and Meinhardt, 150 USPQ 54, 57 (CCPA 1966) wherein the court said:

'References are evaluated by ascertaining the facts fairly disclosed therein as a whole. It is impermissible to first ascertain It is factually what appellants did and then view the prior art in such a manner as to select from the random facts of that art only those which may be modified and the utilized to reconstruct appellant's invention from such prior art. [Emphasis added.]

It is basic that the claims define the invention. The courts have said that:

'All words in a claim must be considered in judging the patentability of that claim against the prior art ... ', In re Wilson, 165 USPQ 494 (CCPA 1970). The terms in the claims 'should be given the meaning they would have 'to one of ordinary skill in the pertinent art when read in the light of and consistently with the specification ...', In re Benson and Tabbott, 169 USPQ 548, 552 (CCPA 1971).

62. The Court of Custom and Patent Appeals in In re Langer and Haynes, 175 USPQ 169, 171 (CCPA 1972) and as to a rejection based upon prior art teachings, said:

'This court has said that '(a)ll of the disclosures in a reference must be evaluated for what they fairly teach (emphasis added) one of the ordinary skill in the art.'

Where is the method of the claims taught in the references? How were all portions of the claims considered in determining obviousness? Does Furuya act as a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal as the Examiner purports? No.

Does Lasche extract product using an inhomogeneous magnetic field intensity which has forces which go as (μ H) *(μ H) as the Examiner purports? No.

Does Wooley extract product using an inhomogeneous magnetic field intensity which has forces which go as (μ H) *(μ H) as the Examiner purports? No.

The figures and claims of Furuya are intended to, and do, serve a different purpose than does the figures and claims in the present invention, and Lasche or Wooley adds nothing of substance to Furuya.

None of the references to which the Examiner refers are concerned with THIS APPLICATION'S novel means to a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal followed by extraction of product using an inhomogeneous magnetic field intensity which has forces proportional to (μ H) *(μ H).

None of the references suggests, alludes to, or teaches a structure as defined by the claims of this invention of Figure 18, therein.

Unsuggested Combination:

63. There is no suggestion in the references themselves that they be combined, or could be combined.

Where was the suggestion of the desirability of the modification? Indeed, neither of the references suggests, alludes to, or teaches a structure as defined by the claims of this invention, and as should be apparent?

The need for the prior art references themselves to suggest that they can be combined is well known.

Therefore, of what relevance then is Furuya and Lasche or Wooley?

64. On the matter of applying references to claimed subject matter [eg. cf. In re Mercier, 185 U.S.P.Q. 774, (CCPA, 1975)]:

> **'These and other questions arise because the board's approach fails to recognize that all of the relevant teachings of the cited references must be considered in determining what they fairly teach to one having ordinary skill in the art. * * * 'The relevant portions of a reference include not only those teachings which would suggest particular aspects of an invention to**

one having ordinary skill in the art, but also those teachings which would lead such a person away from the cited invention.'

65. As was stated in In re Sernaker, 217 U.S.P.Q. 1,6 (CAPC 1983)]:

'(P)rior art references in combination do not make an invention obvious unless something in the prior art references would suggest that advantage to be derived from combining their teachings.'

The suggestion to combine the references should come from the prior art, rather than from applicant. As was forcefully stated in Orthopedic Equipment Co. Inc. v, United States, 217 U.S.P.W. 193, 199 (CAPC 1983):

'It is wrong to use the patent in suit [here the patent application] as a guide through the maze of prior art references, combining the right references in the right way to achieve the result of the claims in suit [here the claims at issue]. Monday morning quarterbacking is quite improper when responding the question of nonobviousness in a court of law [here the Office].'

Indeed, what the Office has done here is to

'pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art'

[In re Umbrecht, 160 USPQ 15, 19 (CCPA 1968)].

There is no teaching in the references that would support the combination the Office uses to reject the claims. The applicable law will now be noted in greater detail.

66. In order to combine references there must be a 'suggestion of the desirability' of the combination, In re Noznik, Tatter and Obenauf, 178 USPQ 43, 45 (CCPA 1973). That holding is the reason why the origin of the combination must be given weight -- not only the possibility of such combination; see the reference to 'motivation or reason in Chicago Rawhide {**} which focuses quite clearly on the rationale of recent decisions of the Court of Appeals for the Federal Circuit (CAFC) on the issue of obviousness, as discussed, for example, in In re Gordon, 221 USPQ 1125 (Fed. Cir. 1984), wherein the court said at page 1127:

'The mere fact that the prior art could be so modified should not have made the modification obvious unless the prior art suggested the desirability of the modification. [Emphasis added]

[{**} Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351, 353 (Bd. of App. 1984)]

There would be no reason for one skilled in the art to combine such disparate references such as Furuya and Lasche or Wooley to purportedly obtain the present invention as the Examiner has done. Furthermore, there is no suggestion in the references themselves that they be combined, or could be combined that way. Thus the applicant submits that any combination of Furuya with Lasche is an improper one, absent any showing in the references themselves that they can or should be so combined.

67. In the present case, the rejection of certain claims uses the Furuya patent [which is related to] which is in the field of a one stage loading and surface sealing methodlocated far afield from Lasche which is in the field of and far from the present invention and the other art. There would be no reason for one skilled in the art to combine disparate references. There is no suggestion in the references themselves that they be combined. Thus, the applicant submits that any combination of Furuya with Lasche or Wooley is an improper one, absent any showing in the references themselves that they can or should be so combined.

In the present case, the rejection of certain claims uses the Furuya patent [which is related to] which is in the field of a one stage loading and surface sealing method located far afield from Wooley which is in the field of use of a magnetic field for producing electric energy directly from a nuclear fusion device and far from the present invention and the other art. There would be no reason for one skilled in the art to combine disparate references. There is no suggestion in the references themselves that they be combined. Thus, the applicant submits that any combination of Furuya with Lasche or Wooley is an improper one, absent any showing in the references themselves that they can or should be so combined.

Where was the suggestion of the desirability of the modification? Indeed, what the Office has done here is to 'pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art', In re Umbrecht, 160 USPQ 15, 19 (CCPA 1968). There is no teaching in the

references that would support the combination the Office uses to reject Claims 1-10 and 12-19. Indeed, neither of the references suggests, alludes to, or teaches a structure as defined by Claims 1-10 and 12-19, or shown in Figure 18, and as should be apparent to the Office.

Thus the applicant submits that any combination of Braden with Miller is an improper one, absent any showing in the references themselves that they can or should be so combined.

68. None of the references suggests, alludes to, or teaches the structure as defined by Claims 1-10 and 12-19. As said in Ex parte Fleischmann, 157 USPQ 155, 156) Bd. of Appeals 1967):

> **'While as an abstract proposition it might be possible to select features from the secondary references, as the examiner has done, and mechanically combine them with the (other citation) to arrive at appellant's claimed combination, we find absolutely no basis for making such combination neither disclosed nor suggested in the patents relied on.'**

On the matter of combining references under section 103, no better expression of the law is found then that in Higley v. Brenner, Cmr. Pats., 155 USPQ 481, 484 (CADC 1967):

> **'The obviousness question here revolves around the Patent Office's combining prior references. Reliance may properly be placed on such a combination to negative patentability where the applicant's subject matter is suggested or 'taught' by the prior references. Application of Van Deventer, 223 F.2d 274, 276 106 USPQ 121, 123 (CCPA 1955); Application of Demarche, 219 F.2d 952, 956, 105 USPQ 65, 69 (CCPA 1955).'**
>
> 'The test of obviousness, however, must be applied as of the time of the invention and not retrospectively as of the time of the suit. Many things may seem obvious after they have been made and for this reason courts should guard against slipping into the use of hindsight'.

Attention is directly to the fact that both Lasche and Wooley involve use of a magnetic field for producing electric energy directly from thermonuclear reactors by way of a magnetohydrodynamic system, using the Lorentz force with the cross-product force (v x m H). By contrast, the present invention uses a different group of materials, for a different group of functions, and a different final result.

Thus, the present invention is not involved in using the Lorentz force, but teaches an extraction proceedure using an inhomogeneous magnetic field intensity which has forces which goes as (m H) *(m H), and not (v x m H) as taught in Lasche and Wooley.

Simply put, the present invention does not use magnetohydrodynamic systems to produce electric energy directly from a nuclear fusion device involving a liquid lithium as taught in Lasche and Wooley.

The Examiner's use of Furuya and either Lasche or Wooley is improper.

The materials used in Lasche and Wooley do not function as the active material used in the present invention. Furthermore, the use of liquid lithium, solid lithium, liquid metal blankets and plasmas in Lasche and Wooley, are quite different from the present invention.

Simply put, the figures and claims of Furuya are intended to, and do, serve a different purpose than does the structure defined by claims herein, and Lasche or Wooley add nothing of substance to Furuya. Thus the applicant submits that any combination of Furuya with Lasche or Wooley is an improper one, absent any showing in the references themselves that they can or should be so combined.

The Examiner's use of Furuya and either Lasche or Wooley is improper. The present invention (confer figure 18) has a system which is incompatible with both Lasche and Wooley, and would not survive therein.

If either Lasche or Wooley were used in the present invention, or placed in any way into the present invention, the combination would not function. The Examiner's use of Furuya and either Lasche or Wooley is improper.

The Examiner's connecting Furuya and either Lasche or Wooley is improper.

There is not a fair standard of review.

Furthermore, how were all portions of the claims considered in determining obviousness?

69. The suggestion to combine the references should come from the prior art, rather than from Examiner.

In the present case, the rejection of claims under 35 U.S.C. 103(a) uses the Furuya patent [which is related to producing heat from loaded palladium using the simple technique of F+P modified by a surface layer and is not the present invention

which involves a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal], and then uses the incorrectly extracted patents from the field of producing electric energy directly from thermonuclear reactors by way of a magnetohydrodynamic systems using hot liquid metal.

Thus, the Examiner has rejected the claims on the basis of 'random facts' in the art cited and has modified those random facts in a manner without 'motivation or reason' derived from those random facts [Chicago-Rawhide]. However, even picking and choosing bits and pieces of the various references as the Office has done here, does not lead one to the invention as defined by Claims 1-10 and 12-19.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 103

The Cited but Non-Applied References

70. The cited but not applied references have been studied but are submitted to be less relevant than the relied upon references.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 103

Additional Reasons Militate In Favor of Unobviousness

71. The applicant respectfully notes to the examiner that there exist additional reasons which militate in favor of unobviousness.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 103

72. **Unexpected Results**: Up to now, insofar as the applicant is aware, the prior art cited by the examiner has virtually ignored how to activate isotopic fuel, which is loaded into a material. The device described within the above-entitled application and thus both superior, unsuggested, and unobvious.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 103

73. Assumed Insolubility. Up to now, many skilled in the art have thought, or have found, that both obtaining fusion of this type, and the specific problem solved by this invention, were insoluble. The failures of much prior art, including but not limited to those cited by the examiner, indicates that a solution of these problems was, therefore, not obvious. This general lack of an obvious solution is discussed in the above-entitled application.

74. In summary, the cited references cannot be combined in the manner suggested and the claimed features of the invention described in the above-entitled application are lacking in the cited references. The present invention is distinct from the prior art and other art. None of the references shows a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal or the use of an inhomogeneous magnetic field to extract product as taught in the above-entitled patent application. Applicant submits that the above-recited novel features in the independent claims, and hence in all claims, provide new and unexpected results and hence should be considered unobvious, making the claims patentable under Section 103.

In accordance with the foregoing arguments, Applicant has fully conformed with the requirements of section 103 of the Patent Act; and further, that claims of the present invention clearly define patentable subject matter. These claims are patentable over the cited references because the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and the physical distinctions effect new and unexpected results, thereby indicating that the physical distinction is simply not obvious [Sec. 103]. Given the above, reconsideration of the rejection of claims is respectfully requested.

RE: U.S.C.112 REJECTION

75. Claims 1-10 and 12-19 stand rejected under 35 U.S.C. 112 by the Examiner, based upon commented rebutted in detail below, and upon flawed reference to other art ("FP" or "F+P"), that he purports did not exist or was flawed thereby invalidating the applicant's independent work over more than a decade which has produced more than fourty papers in peer-reviewed scientific journals.

The Applicant respectfully submits that the original specification, accompanied by the figures of said specification, clarify this matter to one skilled-in-the-art by providing a complete description of the invention.

Loading and Patterns of Failure

76. The Examiner states,

"There is neither an adequate description not enabling disclosure of the parameters of a specific operative embodiment of the invention, including atomic or weight ratio of metal electrodes to electrolyte ..."

"There is neither an adequate description not enabling disclosure of the ... minimum concentration of the isotopic fuel in the cathode necessary for the desired - reactions to take place"

The Truth - Loading Was Discussed and Is Understood

The Examiner inaccurately purports that "loading of the cathode" was inadequate. This notion is utterly incorrect for several reasons which should be known to a PhD in Nuclear Science and Engineering or other professional skilled-in-the-art. The Examiner inaccurately states there is no disclosure of "atomic or weight ratio of metal electrodes to electrolyte (e.g. palladium to gel)". However, this, and the isotope ratios in the metal and loading, were discussed in the original specification [S.N. 07/760,970, continued as S.N. 09/750,765; confer also Swartz (97C)], and in the referred to Applications (for example '457 on page 16, lines 11-14), and in reference to the peer-reviewed articles [Swartz (1992), Swartz (1993), Swartz (1994)].

It is especially important to note that there has been insufficient mention of loading achieved in many of the so-called "negative results" studies upon which the Examiner relies. The proper loading required must usually be in excess of the values mentioned in Examiner's art [and not even mentioned in the majority of the papers which were cited by the Examiner]. Many "negative" results may be, in part, due to inadequate loading, and/or the failure to monitor said loading of isotopic fuel as shown in Figure 1 from the Applicant's peer-reviewed published paper,"Patterns of Failure..." (Swartz 98B).

77. The invention at issue in this case, generally speaking, uses a metal such as palladium which has the unique property of internally filling ("loading") with hydrogen, as a sponge fills with water. Loading of a material (palladium) with a hydrogen is neither unproven "theory" nor "incredible" as the Examiner falsely writes, but can be elicited using the teachings of Applicant's other specifications and claims, as cited. Applicant taught how to introduce fuel ["load"] as claimed. As Dr. Scott Chubb stated about the patent application of which this Application is a divisional, in his Amicus Brief,

> **"...each deuterium nucleus (D) may effectively dissociate from its electron and freely flow through the metallic substrate ... these nuclei ... are free to move throughout a crystal lattice"**

Applicant has discussed loading in considerable detail in several cases before the Office, and these were even understood by the Federal Appellate Court. Applicant did refer to said applications and cases in the present application. Loading is discussed in each of the referred to patent applications of the Applicant, including '457 where it is discussed on page 16, lines 11-14. Specifically, in the '970 application, Applicant taught about loading on pages OS 15-16, 19, 20, 21, 22, 24, 27, 28, and 34 in the original specification. Confer also Swartz (1992), Swartz (1993), Swartz (1994). Applicant's loading technology, consistent with conventional physics, has been published in peer-reviewed journals [Swartz, M., Fusion Technology, 22, 2, 296-300, 1992; 26, 4T, 74-77, 1994; 32, 126-130, 1997; Hagelstein, Swartz, MIT RLE Progress Report, 139: 1, 1-13 (1997); Swartz, Fusion Technology, 31, 228-236 (1997); ICCF-4, (1994); J.New Energy, 1,4,26 (1997); M.Swartz, 1992, "Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal", *Fusion Technology*, 22, 2, 296-300; Swartz, M., 1994, "Isotopic Fuel Loading Coupled To Reactions At An Electrode", *Fusion Technology*, 96, 4T, 74-77; "Codeposition Of Palladium And Deuterium", *Fusion Technology*, 32. 126-130 (1997); Swartz, 1994, "Generalized Isotopic Fuel Loading Equations", and "*Cold Fusion Source Book*", International Symposium On Cold Fusion And Advanced Energy Systems", Ed. H.Fox, Minsk, Belarus; Swartz, 1997]. These are proof and confirmation of Applicant's teachings and demonstrate and confirm enablement of those teachings, and relevant here, also demonstrates confirmation of the teachings taught years earlier in the original specification and claims of which the present application is a divisional.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

78. The Examiner states,

"Following the loading stage, (in Patterson,) the current level between electrodes 15 and 16 is then incrementally increased."

THE TRUTH - Optimal Operating Point Control is Used

Patterson does not discuss loading at all from a spatial point of view. The present invention teaches first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. The loading is done through optimal operating point control, exactly the opposite of Patterson. Patterson strives for "electrolysis" as the titles, description and claims of Patterson 1, and 2 admit. This is not even close to the present invention which minimizes electrolysis. As Applicant taught, the loading flux [of the isotope of hydrogen into the cathode], must be distinguished both from the gas evolving flux, and even from the total current, as well (Swartz 1992).

"The three additional components of deuteron flux must be considered. The first is the entry of deuterons into the bulk of palladium which constituted the cathode. That flux is described as Je, the rate at which deuterons physically enter the palladium cathode. The second deuteron flux is that component lost at the cathode to gas evolution ... (Jg)... Jf is the the flux of deuterons lost to fusion."

[Swartz, M., QUASI-ONE-DIMENSIONAL MODEL OF ELECTROCHEMICAL LOADING OF ISOTOPIC FUEL INTO A METAL, Fusion Technology, 296-300 (1992)]

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

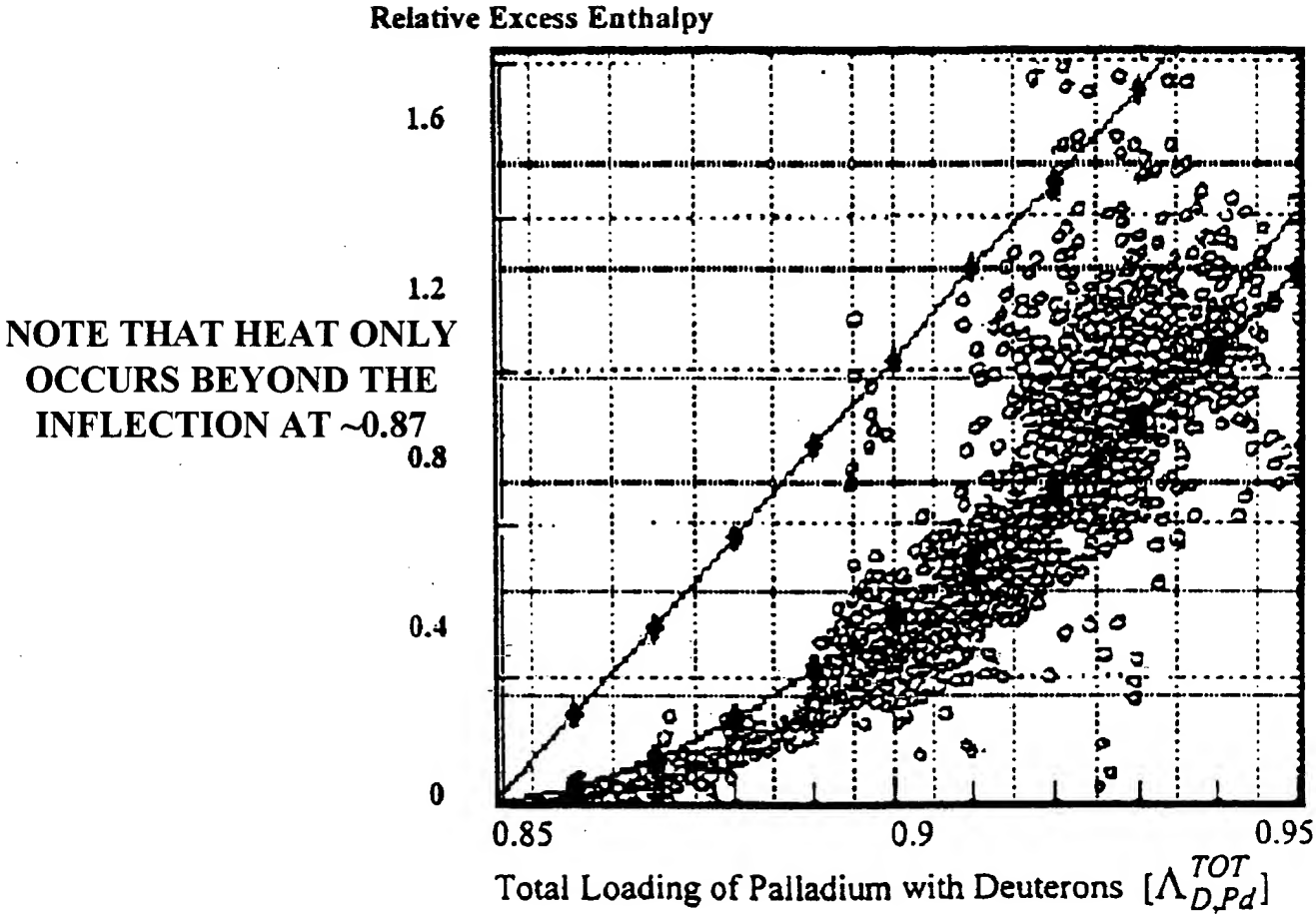

FIGURE 1 - IMPORTANCE OF LOADING AN ELECTRODE

This figure shows the increase in observed excess enthalpy (or heat, shown along vertical axis) from a palladium (Pd) electrode loaded with deuterons (D) from heavy water. Increased loading is towards the right hand side. The data [open symbols] show the excess heat as a function of loading, and are from an independant palladium-heavy water system [after M. McKubre (1993)]. This shows the importance of monitoring an electrode because the desired product (excess heat) only appear after loadings of ~0.85 D/Pd are achieved [the atomic ratio of 85 deuterons to 100 palladium (Pd) nuclei within the electrode]. Attention is directed not only to the fact that the desired reactions are zero below ~0.85.

79. The Examiner states,

"The disclosure is insufficient as to what exactly are the terms A, F. L, I and KF In the D+(z) equation."

The terms mean area, Faraday, characteristic length, electrical current, and first order rate of reaction for the desired reactions. They are well known to the those familiar with the state of the art. In any case, to avoid all confusion, the applicant will now add them explicitly, along with citations to the reference, in the application. The Examiner is referred to the following on electrochemistry and continuum electrodynamics, *sine qua non* to those skilled in the art.

Uhlig, H.H., "Corrosion and Corrosion Control", Wiley (1971).

Bockris, O'm, J., K.N. Reddy, "Modern Electrochemistry", Plenum Press (1970).

VON HIPPEL, A. "Dielectric Materials and Applications", MIT Press, (1954); Von Hippel, A., D.B. Knoll, W.B. Westphal, "Transfer Of Protons Through 'Pure' ICE Ih Single Crystals", J. Chem. Phys., 54, 134, (also 145), (1971).

MELCHER, J.R., "Continuum Electromechanics", MIT Press, Cambridge, (1981).

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

[Applicant notes that he was fortunate enough to have served in the Laboratory for Insulation Research at MIT for Dr. Arthur von Hippel and to have received three degrees in electrical engineering there for work including thesis work of which Dr. von Hippel was the Supervisor. He has studied under the late Dr. Jim Melcher and Herbert Uhlig for several years each at MIT, and has Dr. Bockris as a colleague for several years in the field of which the present invention has great utility.]

80. The Examiner states,

"On page 11, lines 9+, an equation is given for the spatial distribution of deuterons D+(z). However, there is neither an adequate description nor enabling disclosure of how in what manner this distribution was derived from the molecular flux, F(D+)."

The equation is the first of the quasi-1-dimensional model of loading which offers insight into the processes because it indicates how both competitive gas evolving reactions at the metal electrode surface and the ratio of the applied electric field energy to thermal energy [kB*T] are decisive in controlling the loading of the metal by the deuterium. As fully taught in the disclosure, and the patents which are referred to, the power source generates the applied electric field intensity. The induced drift by the applied electric field is shown schematically in the figure which does not mean that the deuterons travel in such a simple fashion. The electric field

distribution is altered as the solution and system each respond with complex conduction and polarization phenomena. Ionic drift, secondary space charge polarization, propagation of solvated deuterons, deuterons in clathrates, and L-,D-deuteron defects with their ferroelectric inscription in the heavy water, and the formation low dielectric constant bubbles abutting the cathode are the minimum expected. The double layer between the solution and the metal is created both by the cathode fall of ions and other polarization reactions.

The mechanisms of dielectric polarization and conduction have been cited in the submitted applications by the applicant which are referred to in the present application. If any are omitted they are now added to this disclosure, to supplement the others.

81. The Examiner states,

"The disclosure is insufficient as to what exactly are the variables that are time and/or space dependent In the F(D+) equation. (The examiner assumes that there are both time and spatial dependencies in these variables since the time and space derivative operations are shown)."

Assuming the Examiner is familiar with this, those skilled in the art understand that the applied electric field influences the spatial distribution of deuterons in aqueous solution. Without significant convection, the flux (Ji) of any ith species (here deuterons) results from diffusion down concentration gradients and electrophoretic drift.

$$J_D = -B_D * \frac{d[D(z,t)]}{dz} - \mu_D * [D(z,t)] * \frac{d\Phi}{dz} \quad \text{(eq.1)}$$

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this is now cited in the specification.

82. The Examiner states,

"The disclosure is insufficient as to what exactly B is diffusivity of. Also, the disclosure is insufficient as to whether B is a constant or space ancl/or time-dependent."

The parameters which the Examiner is having trouble understanding are well known in the field. The equation can be examined for its relation to thermal processes by substitution using additional non-dimensional parameters and the Einstein relation.

$$\frac{B_D}{\mu_D} = \frac{k_B * T}{q} \qquad \text{(eq.2)}$$

Coupled equations thus determine the distribution of deuteron species in the bulk solution.

Applicant thanks the Examiner for bringing this up, and so this is cited in the the amended specification.

83. The Examiner states,

"The disclosure is insufficient as to how and what losses, if any, are exactly accounted for in the equations (e.g., loss due to deuteron gas evolution from the bulk solution)."

"The disclosure is insufficient as to what exactly-are the approximations made ... .'

The loading flux [of the isotope of hydrogen into the bulk volume of the palladium cathode] is fundamental to the entire understanding of these phenomena, and it was explicitly taught in the original specification. The loading flux must also be distinguished both from the gas evolving flux, and even from the total current, as well. For additional background, the Office is referred to Swartz, M., "Quasi-One-Dimensional Model Of Electrochemical Loading Of Isotopic Fuel Into A Metal", Fusion Technology, 296-300 (1992) Swartz, M., "Isotopic Fuel Loading Coupled To Reactions At An Electrode", ICCF-4 (1993); Swartz 97C, 97B. These equations are complex because they include the differential isotope diffusivity, electrophoretic mobility, solubilities and the range of susceptibilities of the materials and products involved, which have parameters and vary with temperature. Applicants writings, including the original specifications filed with the Patent Office go on with how the results of the mathematical expression concerning the deuteron flux into palladium relates to the applied electric field intensity.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

84. The Examiner states,

"The disclosure is insufficient as to whether KC is a constant or a variable.

"For example, the disclosure is insufficient as to whether Kf is a constant or a variable... and as to whether or not these parameters are time and/or spatially dependent."

"The disclosure is insufficient as to which parameters on the right hand side of the D+(z) equation are spatially dependent."

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, this material is corrected and cited by reference to peer-reviewed publication in the specification.

85. The Examiner states,

""There is neither an adequate description nor enabling disclosure of how and in what manner, one can control the loading of isotopic fuel into a material."

"there is neither an adequate description nor enabling disclosure of how and in what manner said method of loading is done."

Truth - Charging Of Palladium And Optimal Operating Points Understood

The Examiner inaccurately purports that the description of means to "charge the palladium with deuterons" was inadequate, and that the specification (which does refer to other pending applications) was not unique. This notion is utterly incorrect for several reasons. Applicant cites his publications and other applications. In '457 Applicant taught "increasing through a series of at least three incremental steps the electric power drive conditions of said electrical circuit" on page 15, lines 15-20, and page 23, lines 14-17. Furthermore, in '457 and in the corresponding figures in Swartz(97), there are graphs of the output [Figure 6, labels 701, 702] and the V-I (voltage current) characteristics [Figure 5, labels 503, 510, 519, 520, 504, 521].

Many "negative" results the result of the failure to operate the system at the optimal operating point, as shown in Figure 2 from the Applicant's peer-reviewed published paper.

Furthermore, in addition, to alleviate any possible additional problem which the Examiner might have, the Applicant has now amended this application to include again said references to said other applications, and to said peer-reviewed published papers.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

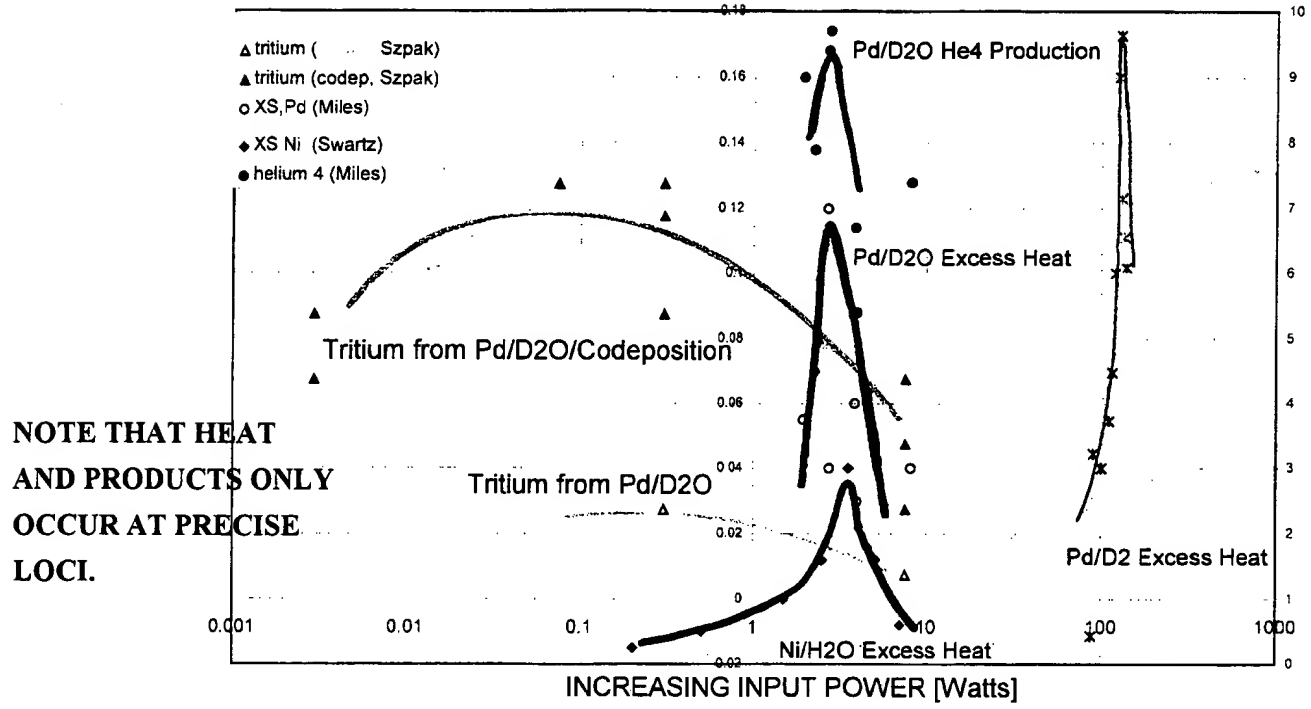

FIGURE 2 - OPTIMAL OPERATING POINTS

In addition to loading, "optimal operating points" must be understood to successfully use LENR/CF systems. This graph shows the biphasic response of the products (heat, helium-4, tritium) of these systems to increasing input electrical driving power. The horizontal axis represents the electrical input power and is logarithmic. The nickel light water data is from Swartz; the palladium heavy water data are from Miles (USN) and Szpak (USN). The data reveal relatively narrow loci of optimal operating points. Driving with electrical input power beyond the peaks (optimal operating points) does not help the production of the desired product but yields a falloff with increasing input power. Optimal operating points account for some of the widespread difficulties in observing these phenomena because of driving the systems inadvertently or unintentionally outside of the optimal operating point (Swartz. M., Journal New Energy, 4, 2, 218-228 (1999), Swartz. M., Transactions of the American Nuclear Association, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85); Swartz. M., G. Verner, A. Frank, H. Fox, Journal of New Energy, 4, 2, 215-217 (1999); Swartz. M., 1997, Fusion Technology, 31, 63-74).

86. The Examiner states,

"..the disclosure is insufficient as to what exactly is meant by the term "sudden rapid ("catastrophic") flow of hydrogen" and how does one determine whether such sudden rapid flow has been achieved."

TRUTH - Catastrophic Desaturation Was Definite And Has Gone Through Peer-Review

The system is designed to enable the generation of a catastrophic desaturation. In the present case, the palladium is saturated, fully loaded, with isotopic fuel, and then the catastrophic condition is created. The office purports inadequate enablement of "catastrophic desaturation", and that it is indefinite. In fact, contradicting the Examiner, the applicant's peer-reviewed publications about catastrophic desaturation have been published by EPRI, the U.S. Navy, the American Nuclear Society. Applicant's publications have taught internal diffusion flux of isotopic fuel (hyrogen) as discussed in peer-reviewed journals [Hagelstein, Swartz, Optics and Quantum Electronics, *MIT RLE Progress Report*, 139: 1, 1-13 (1997); Swartz, 1997, "Phusons in Nuclear Reactions in Solids", *Fusion Technology*, 31, 228-236 (1997); Swartz, 1994, "Catastrophic Active Medium Hypothesis of Cold Fusion", 4, "*Proceedings: "Fourth International Conference on Cold Fusion*" sponsored by EPRI and the Office of Naval Research; Swartz, 1997, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33]. This is confirmation of Applicant's teachings of internal diffusion isotopic fuel and interstitial barriers. Importantly, these teachings confirm operability as taught years earlier in the original specification and claims.

The Applicant notes that these papers --involving catastrophic desaturation-- underwent peer-review and were published. Furthermore, those who are skilled-in-the-art have agreed that said catastrophic desaturation is a critical issue for the successful performance of the system [Swartz (94B), Swartz (97B)]. The present invention is a divisional of S.N. 07/760,970 ("the '970 application"), a two-stage method to control loading. In the original disclosure of which the present application is a divisional, catastrophic desaturation was presented in several figures and discussed, including the use of pressure, temperature, or other means to generate said catastrophic desaturation. In the '970 application, Applicant taught about generating movements of isotopic fuel in the loaded metal ["flux"] on pages OS 15-16, 19, 20, 21,22, 24, 27, 28, and 34 in the original specification of which this present applcation is a divisional.

"The fusion reaction is driven by the catastrophic fractional desaturation of deuterons from the crystalline palladium lattice, previously filled to capacity."

[07/760,970; Original Specification, page 21-22]

S.N.07/760,970 [now as Continuation] involves a two-stage process involving loading of hydrogen into a metal electrode such as palladium. Applicant taught using a first stage of electrode loading, followed by, a second stage of sudden rapid ("catastrophic") flow of the loaded hydrogen within the metal. Applicant taught in the original specification and claims how this apparatus works and presented objective detailed evidence of the invention. The first stage is the electrode loading, and then, in the second stage a rapid ("catastrophic") flow of hydrogen results within the metal. After the initial loading, said flow (or flux) of hydrogen takes place (pages 15-16,19-22,28,33-34; S.N.07/760,970) until the previously-loaded palladium is spent of its deuterons or the material is otherwise damaged.

87. The Examiner states,

"There is neither an adequate description not enabling disclosure of the ... the exact composition.... of the electrolyte .... cathode and of the anode"

TRUTH - Composition Of Electrodes And Solution And Materials And Barrers Were Given

11. This is inaccurate. Attention was also directed to Swartz (07/339,976; filed April 18, 1989, a specification pending before the Patent Office) and Swartz (07/371,937; filed June 27, 1989, specifications pending before the Patent Office, now as a Continuation). Swartz '457 also contains relevant information. Swartz patent applications and the other peer-reviewed references are now fully cited in the original above-entitled specification. Reference to other patents is allowable.

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, said patents and references are now appended into the specification.

88. The Examiner states,

"There is neither an adequate description not enabling disclosure of the ... voltage and current requirements..."

... there is neither an adequate description of the elements that constitute said power supply ..".

TRUTH - Electrical Description Was Given

This is inaccurate. Attention was also directed to Swartz (07/339,976; filed April 18, 1989, a specification pending before the Patent Office) and Swartz (07/371,937; filed June 27, 1989, specifications pending before the Patent Office, now as a Continuation). Swartz '457 also contains relevant information. Swartz patent applications and the other peer-reviewed references are now fully cited in the original above-entitled specification. Reference to other patents is allowable.

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

Swartz (07/339,976) taught the use of a current source. The FUSOR was the brand of power supply from JET Energy Technology [Wellesley, MA]. '457 and the cited papers gave full disclosure of voltage and current requirements. The voltage and current requirements are discussed in the original specifications to which the present application does refer, including in the referred-to Application ['457] on page 15, lines 15-20, therein, along with Figures 4, 5, 6 which show the voltage, and the electrical power and power gain (which are the more important engineering parameters); confer also Swartz (97A, 98A).

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, this material, cited in the other applications of applicant, are now appended into the specification.

89. The Examiner states,

"There is neither an adequate description not enabling disclosure of the ... surface area-to-volume requirement for the reactor."

"There is neither an adequate description not enabling disclosure of the ... dimensional ratio of electrodes to their spacing (i.e., sizes of anode and cathode relative to the space between them)."

TRUTH - Gauss' Law And Nondimensional Analyses Are Reasonable

The Examiner inaccurately states there is no disclosure of "surface area-to-volume requirement for the reactor". However, this is inaccurate because the relevant issues of temperature, mass, and thermal capacity were discussed in the original specification, and in the referred-to Application ['457] including on page 22, lines 3-11, therein.

The Examiner inaccurately states there is no disclosure of "dimensional ratio of electrodes to their spacing (i.e., sizes anode and cathode relative to the space between them)". The Applicant reminds the Examiner of simple electrostatics in general, and Gauss's Law in particular, which require that metals assume equipotentials, unlike the aqueous and gel solutions involved in the present application. If the Examiner feels that his notion defeats conventional electrophysics, then perhaps he should state with specificity his question, rather than just "brick-toss" words which are not consistent with electrical engineering practice.

90. The Examiner states,

"On page 7, lines 13-14, the applicant discloses that the "deuteron-impenetrable barrier(s) act to enhance the fusion reactions. However, there is neither an adequate description nor enabling disclosure of how and in what manner said reactions would be enhanced by the barriers that are impenetrable to deuterons."

THE TRUTH - DEUTERON IMPENETRABLE BARRIERS REFER TO DIFFERENT APPLICATION

As taught in the original specification, Applicant has described barriers which are used to strategically inhibit the flow of hydrogen loaded into the metal (confer Appendix C which is in the file record, and included here again for reference). This was also discussed in a peer-reviewed publication to which the specification will now refer on amendment. The fugacity versus pressure issue is discussed below.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, this material is now more clearly cited in the specification.

91. The Examiner states,

"On page 20 lines 8+, the applicant discloses that fugacities involving hydrogenated palladium range from 5000 to 107 atmospheres. However, there is neither an adequate description nor enabling disclosure of how and in what manner the integrity of the apparatus can be maintained under these pressures that the applicant refers to as "astronomic pressures." (see page 14, line 13)."

"Also, there is neither an adequate description nor enabling disclosure of how and in what manner the reactions can be sustained (i.e., not terminated) given these astronomical pressures that are potentially disruptive or destructive."

THE TRUTH - Fugacity is Calculated

With all due respect, fugacity is a calculated pressure within an electrochemically used electrode, and not a physical pressure such as would deform a surface pursuant to Laplace's Law and the Young relation for stress and strain. Background from the Examiner on fugacity against includes Uhlig, H.H., "Corrosion and Corrosion Control", Wiley (1971) and Bockris, O'm, J., K.N. Reddy, "Modern Electrochemistry", Plenum Press (1970), especially Bockris.

Furthermore, the Examiner is incorrect because pressure range is discussed in the original specification of '970, and in the referred-to Application ('457) with reference to number 132 in Figure 3, on page 17, lines 18-22, therein, and in the other peer-reviewed publications cited above.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, this material is now more clearly cited in the specification.

THE SKILLED-IN-THE-ART SUPPORT APPLICANT

92. To rebut the Examiner, the Applicant hereby submits several Declarations by those skilled-in-the-art. The Declarations substantially and fully address all matters and issues criticized by the Examiner, and contain averments regarding evidence establishing the utility, validation, and operability of the Applicant's claimed subject matter.

These include the Straus (4/22/94), Swartz, and other Declarations, including but not limited to the Amicus Curiae Briefs of Edmund Storms (2/21/01), Talbot Chubb (2/221/01), Eugene Mallove (3/24/00) and Hal Fox (2/21/01). Said Declarations are hereby accompanied by statements supporting their introduction including full and explicit showing of good and sufficient reasons why they were not presented earlier (including that they are already in the preceeding file folder).

The Declarations contain factual statements directly addressing how the specification adequately described the subject matter recited in the claims.

The Declarations prove that the Applicant taught in the original specification and claims how his apparatus works and claimed the invention.

The Declarations demonstrate that a person of ordinary skill in the art would have understood the inventor to have been in possession of the claimed invention at the time of filing.

The Declarations demonstrate that the invention operates as stated, and as explicitly taught in the original specification and claims.

Validation occurs when scientists actually skilled, and working, in the state-of-the-art state it to be so. Said scientists write the scientific technical papers which undergo peer-review, file the patents applications, and attend international conferences (which have gone on for 13 years -- and they disagree with the Examiner. Therefore, the Examiner must not err by failing to consider those skilled-in-the-art who counter the rejection under 35U.S.C.§112 and §101 because the Declarations demonstrate utility and operability as taught in the original specification and claims.

Peer-Reviewed Publications Prove Enablement

93. The present invention involves a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

Supporting utility and operability and demonstrating enablement of the present invention, the Applicant submits (and has previously submitted) his publications involving the present invention, which have been published in the peer-reviewed hot fusion journal of the American Nuclear Society [including Swartz. M., 1997, *Fusion Technology,* 31, 63-74, hereafter "Swartz(97)"]. Swartz(97) [*Fusion Technology,* 31, 63-74, 1997], proves utility and operability and demonstrate enablement for a person with ordinary skill-in-the-art. These papers, including Swartz(97) and the other publications, are submitted again, and are listed on Forms 1440. The Applicant has assumed that they were already in the record, but are now again necessary because of the misstatements by the Examiner. Swartz(97) and the other peer-reviewed publications demonstrate that the invention was correctly taught in

the original specification and claims on the filing date of the application [validation].

94. Applicant's publications in peer-reviewed journals have taught the desired reactions and system operation [Swartz, M., "Generality of Optimal Operating Point Behavior in Low Energy Nuclear Systems", *Journal of New Energy*, 4, 2, 218-228 (1999); Swartz, *et alia*, "Importance of Non-dimensional Numbers and Optimal Operating Points in Cold Fusion", *Journal of New Energy*, 4, 2, 215-217 (1999); Swartz, 1997, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74; Swartz, 1998, "Optimal Operating Point Characteristics of Nickel Light Water Experiments", "*Proceedings of ICCF-7*"; "Codeposition Of Palladium And Deuterium", *ibid*; Swartz, 1998, Improved Electrolytic Reactor Performance Using π-Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85; Swartz, 1997, "Biphasic Behavior in Thermal Electrolytic Generators Using Nickel Cathodes", *IECEC 1997 Proceedings*, #97009; Swartz, 1998].

95. Furthermore, Applicant's publications in peer-reviewed journals have taught standards and quality control ("Q/C") which are relevant to experimental operability ["Patterns of Failure in Cold Fusion Experiments, Proceedings of the 33RD Intersociety Engineering Conference on Energy Conversion, IECEC-98-I229, Colorado Springs, CO, 1998; Swartz, M, 1997, "Noise Measurement in cold fusion systems, *Journal of New Energy*, 2, 2, 56-61; Swartz, 1996, "A Method To Improve Algorithms Used To Detect Steady State Excess Enthalpy", *Transactions of Fusion Technology*, 26, 156-159; Swartz, 1993, "Some Lessons from Optical Examination of the PFC Phase-II Calormetric Curves", 2, Proceedings: "Fourth International Conference on Cold Fusion", 19-1, *op. cit.*; Swartz, 1996, "Relative Impact of Thermal Stratification of the Air Surrounding a Calorimeter", *Journal of New Energy*, 2, 219-221 (1996); Swartz, 1996, "Improved Calculations Involving Energy Release Using a Buoyancy Transport Correction", *Journal of New Energy*, 1, 3, 219-221; Swartz, 1996, "Potential for Positional Variation in Flow Calorimetric Systems", *Journal of New Energy*, 1, 126-130; Swartz, 1997; Swartz, 1996, "Definitions Of Power Amplification Factor", *J New Energy*, 2, 54-59, and Swartz, 1997, "Explanations for Some Differences Between Reports of Excess Heat in Solid State Fusion Experiments", *J New Energy*, 2, 1, 60-65].

96. Applicant's publications in peer-reviewed journals are evidence demonstrating that he has correctly taught operability and enablement [Swartz. M., 1994 "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "*Proceedings: "Fourth International Conference on Cold Fusion*", sponsored by EPRI and the Office of Naval Research, and Swartz, M., 1997, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33, but also Swartz, M, 1998, Improved Electrolytic Reactor Performance Using π-Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85]. These prove utility and operability (a question of fact).

97. Applicant's publications in peer-reviewed journals confirm operability as taught years earlier in the original specification and claims. Attention is directed to the fact that Applicant's publications in peer-reviewed journals are NOT press releases unlike those whom the Examiner cites as segue to bring in other much less relevant art. Applicant's publications are peer-reviewed and therefore they demonstrate validation, utility, operability, and enablement as taught in the above-entitled original specification and claims. Therefore, enablement has been shown both by the Declarations and by said peer-reviewed publications.

LAW

98. These publications prove Applicant was correct on the filing date of the application [In re Hogan, 559 F.2d 595, 60S, 194 USPQ 527, 537 (CCPA 1977)].

The original specification and claims of the present invention also taught and claimed a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21].

99. The Examiner states,

"cold fusion" ... publicly announced by Fleischmann and Pons (hereinafter referred to as "F and P") on March 23, 1989... is still no more than just an unproven concept."

TRUTH - The Examiner's Argument Is Cut From Cloth Other Then THIS Application

The Examiner deviates from the present invention and refers to other art, far from the original specification and claims. Such handwaving to other much less relevant art is not a fair rebuttal, but is a different issue cut of a cloth not even made from the original specification and claims. Enablement, on the other hand, must be judged on this original specification and claims.

This invention is a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

The present invention is useful, as described in the original specification, including for devices which involve loading of metals by hydrogen, as stated in the specification, and corroborated in the Declarations by those skilled-in-the-art. This diversity of use is consistent with the directive of the court [In re Swartz 00-1107 and In re Swartz 00-1108].

It is only by calling the present invention "cold fusion", instead of a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities, that the Examiner can purport that the heat measurement is "unattainable" and continue the Examiner's unfounded attack on the Applicant with his deliberate misreading of specification and claims as his segue to much less relevant art attacking "FP" (for Drs. Fleischmann and Pons).

The present invention is not the work of Pons/Fleischmann or their purported subject matter. Therefore, the Examiner's continual referral to other much less relevant art (FP) is not a rebuttal of this invention, but is neither proper nor fair because it is a further prejudicial attack against the Applicant. By contrast, the present invention involves a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities. The present invention does not involved the issues that the Examiner states. However, many of these

issues have been discussed in the applicant's peer review published papers, and in the applicant's other patent applications. In order to fully comply, the applicant has amended the present application to refer to the published literature, peer review by the American nuclear society's "fusion technology", which preceded the present application. These references demonstrate that there isn't enabling disclosure by the applicant, and that has undergone peer review by members of the American Nuclear Society and by the United States Navy.

In fact, if the Examiner must rely upon reference to art cut of a cloth other than this specification and claims, then his position must indeed be quite weak.

100. Given the extensive "positive" published results which confirm the generation of products (including excess enthalpy) using isotopic fuel loaded into a material, the applicant therefore respectfully requests that the Examiner reconsider the rejection.

The Examiner should examine the three (3) videos which Applicant sent [CBC (1993), CBC (1994); BBC (1994)] to the file folder, of which this application is a Divisional. Said videos rebut the Examiner.

The Examiner should examine the ~300 published scientific articles which Applicant sent [over 140 pounds of Exhibits] including over 30 of the Applicant's own peer-reviewed papers (several published by the American Nuclear Society, Fusion Technology) which were submitted. Important publications included Swartz(92), Swartz(94A), Swartz (97A) and Swartz(99), but also Mallove pp246-248, Storms(90,93); Arata(90); Celani(90); Pons(90); Bockris(90); Szpak(91B); McKubre(91); Will(91,93,94), Miles(94C,91,93B,94C); and McKubre, SRI ["Summary During ICCF-7", Infinite Energy, 4, 20, pp.34-35, (1998)]. The Exhibits are in the file folder of which this application is a Divisional. Instead, the Examiner relies on its rebutted "reports" from "science" reporters and those competing for Federal funds, all of whom do not even refer to the present invention. Nor have they been sworn in, or have been proven to be an expert, as the Applicant has done with his Declarants, and as the Applicant again requests of the Examiner, if he continues to rely on them.

101. The Applicant has already made comprehensive discussion of the errors in the Office by its reliance on Lewis, Huizenga, Jones, Morrison, Miller, etc. was made with solid substantive response. Discussion of the errors in Albagli was made with solid substantive response, including in the Federal Appellate Court [regarding '457 in the Appendix therein at A203-204,A244,A278-A279,A3553-355,A367-A370,A391, and especially A368]. Discussion of the errors in Cooke was made with solid substantive response, including in this Court [A208,A389-391]. Discussion of the errors in Huizenga was made with solid substantive response [A206,A243,A275-276,A279,A294-295]. Discussion of the errors in Jones was made with solid substantive response [A205,A251-A252,A291-292,A322; also A65,A70]. Discussion of the errors in Miller, a new argument by the Office before the Board, was made with solid substantive response [A316-317,A321]. Discussion of the errors in Morrison was made with solid substantive response [A252-253,A292-A293,A323].

102. Ziegler, Faller, Salamon, and Cooke report negative results, while looking for neutrons. Attention is directed to the fact that Faller did report a tritium increase. Other actually "positive" evidence in the Examiner's art which does support the existence of these reactions From 1989, Shani monitored stimulated neutron radiation from deuterated materials after being neutron-irradiated. However, fusion of isotopic fuel in a material does not usually produce significant numbers of neutrons external to said material. Therefore these so-called putative "negative" results do not negate anything at all. In addition, not all of the art cited by the examiner was "negative" with respect to neutrons. Within the papers cited by the examiner, Shani did in fact monitor stimulated neutron radiation from deuterated materials after said deuterated materials were neutron-irradiated.

103. Some of the relied upon references cited by the Examiner are, or quote, "negative" results [eg. Browne, Lewis, Miskelly, Hilts - for example] which have been contested. Attention is drawn to the fact that most of the periodicals and newspapers cited by the examiner involve merely quoting the so-called "negative results" of others, either the Massachusetts Institute of Technology [MIT] (eg. Hilts) or Lewis et alia (Hilts, Browne). Given that the reference articles may be flawed, the additional tabloids referring to such obviously must be weighed accordingly, and are more than balanced by Bishop, Pollack, Schlesinger, Port, Chandler, and Freedman.

The Examiner continues to quote altered data in Albagli, but fail to cite, or explain the basis for ignoring, Applicant's evidence which was timely and repeatedly submitted [e.g. in the Federal Appellate case regarding '457 in the Appendix therein at A203-204,A244,A278-A279,A3553-355,A367-A370,A391, and especially A368]. The Office communication thus has disingenuous false statements and citations known to be false a priori by the Office [Niehot'f v. Sahagian, 103 A.2d 211 (Me. 1954)] and is therefore a breach of duty [Rannard v. Lockheed Aircraft Corp., 26 Cal. 2d 149 (1945), 18 U.S.C.§1503]. The Office communication is thus in error [People v. Pierce, 66 Cal. 2d 53 (1967); U.S.v. Price, 86 S. Ct. 1152, 1157, footnote 7; Sawtelle v. Farrell, 70 F.3d 1381, 1387 (1st Cir. 1995); Leasco Data Processing Equip. Corp. v. Maxwell, 468 F.2d 1326 (2d Cir. 1972); Pizarro v. Hotels Concorde Int'l, C.A., 907 F.2d 1256 (1st Cir. 1990); Peckham v. Continental Casualty Ins. Co., 895 F.2d 830, 836 (1st Cir. 1990); Donatelli v. National Hockey League, 893 F.2 459, 465 (1st Cir. 1990)].

104. The post-April 1990 literature supports the "existence" of the "cold fusion" effect(s). Much peer-reviewed, and other, art is available in Fusion Technology, Fusion Facts, and other journals. These dispute the Office. The chief product of the cold fusion reaction(s) is excess heat, but other released particles have also been reported {including tritium [Srinivasan, Current Science, 143 (1991); Storms, Fusion Technology, 17, 680 (1990)], sparse neutrons [Gozzi, J. Fusion Energy, 9, 241 (1990); Menlove, J. Fusion Energy, 9, 495 (1990)], helium-4 [Bush, J. Electro. Chem., 304, 271 (1991)], and possibly heavy elements [Matsumoto, Fusion Technology, 20, 323 (1991)]}.

Can the Examiner read all 9 volumes of the *Cold Fusion Times* and honestly state that the field does not exist?

105. In an attempt to support the unfair rejection, the Examiner cites other art including very less relevant experimental and theoretical papers, and also some columns from periodicals and newspapers. Of said art, most are from 1989. Close examination of said art reveals that all of said cited art appears to be dated before 1991. Thus, and as demonstrated below, the papers cited by the Examiner are functionally "old" and out-of-date.

The applicant respectfully notes that there are many problems with reliance upon newspapers. First, examples of the failure of "headlines" to be fair representative appraisals of new technology include the following:

> **"... after a few more flashes in the pan, we shall hear very little more of Edison or his electric lamp. Every claim he makes has been tested and proved impracticable."**
>
> [New York Times, January 16, 1880]

Second, the paper [from 1989] cited {Stiff} reported possibly negative results in the Wall Street Journal. However recent issues from the very same Journal now report positive results (cf. Bishop). In the New York Times there has been a similar shift in position. The issue of November 17, 1992 {Pollack} demonstrates the reported positive results. See also Freedman (in Science), Dagani (Chemical and Engineering News), Chandler (Boston Globe), Schlesinger, Port, as well.

106. The papers cited by the Examiner are functionally "old" and out-of-date. Even the very newspapers which the Examiner has cited now publish updates which herald that there is increasing acceptance of, interest in, and growth of this field [cf. Freedman (Science 4/24/92), Chandler (Boston Globe 4/17/92)]. As a result, it is reported that scientists are "quite convinced that there is a source of heat" [Prof. Philip Morrison as reported in Chandler] and are "not concerned about the lack of neutrons (expected in a conventional) fusion reaction" [Prof. Louis Smullin as reported in Freedman]. Dagani (1992) now reports that growing numbers of the scientific community do take seriously the "excess heat". See also Chandler, Freedman, Bishop.

107. Several of the papers cited by the examiner are theoretical. Some of these "negative theoretical" citations calculate, using what may be incorrect or false assumptions and approximations, that fusion of isotopic fuel in a material, ie. cold fusion, can not "work" (eg. Ohashi, Cribier, Chapline). The applicant respectfully asks the examiner to reconsider, because in actual fact such calculations were historically presented "proving" that heavier-than-air ships (ie. airplanes) "cannot fly".

As another example: such calculations only created a virtual "drag" to the innovation of ideas, and their development and implementation, involving airships - which later evolved to include jets and spacecraft.

"Professor Goddard ... does not know the relation of action to reaction ... he only seems to lack the knowledge ladled out daily in our high schools"

[New York Times, January 13, 1920]

108. The Examner is directed to the Office's citation of the NCFI report, and attention is now closely drawn to comments therein.

"Cold fusion work continues in many countries ... The occurrence of nuclear reactions in deuterium-loaded solids, such as palladium and titanium can no longer be reasonably denied. ... Several government laboratories are continuing their work on cold fusion, among them most notably are Los Alamos National Laboratories, The Naval Research Laboratory, The Naval Underwater Systems Command and The Naval Weapons Center. Significant positive results have been obtained in each of these laboratories. ... Over 100 groups from more than 12 countries have now reported on various types of evidence for the occurrence of nuclear reactions in deuterium-loaded metals or compounds."

[F. Will; Final Report National Cold Fusion Inst. (1991)]

NCFI efforts in-house in fact did support the existence of, and significant investment in, the "cold fusion" phenomena. The NCFI Report documented widespread examination of these phenomena.

Today, one of the most interesting papers in this field is from Mitsubishi delivered in China to the 9th International Cold Fusion meeting 4/02. The US is now 13 years behind other countries because of the US Patent Office denies allowing valid patent ignoring both Constitutional and Congressional directive.

LAW

109. Ignored in the Examiner's Communication are the following standards of review.

The Examiner ignores In re Prater, 415 F.2d 1393, 162 USPQ 541 (CCPA 1969)] which requires the Examiner to refer to the claimed invention as the focus of its Office communication, but it did not when drifting toward criticism of "FP".

The Examiner ignores In re Morris which requires that the Examiner must respond to what Applicant meant, but he did not.

The Examiner ignores In re Hogan [559 F.2d 595, 60S, 194 USPQ 527, 537 (CCPA 1977)] which discusses that enablement must be judged on the original specification and claims, but in this Communication it was not.

The Examiner ignores In re Fouche [439 F.2d 1237, 1243, 169 USPQ 429, 434, (CCPA 1971) and In re Zletz [893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989)] which state that an invention (in structure, operation and composition) is defined by the claims and the original specification. This invention is a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

The Examiner ignores Rule 132 which requires Applicant's solid, substantial, and timely, evidence submitted against the Examiner's rejections be considered because "(p)atentability is determined on the totality of the record, by a preponderance of the evidence with due consideration to persuasiveness of argument." [Id. at 1445, 24 USPQ2d at 1444]. Applicant has published his inventions, proving that this invention was correctly taught in the original specification and claims, on the filing date of the application.

The Examiner ignores In re Gazave, 54 CCPA 1524, 379 F.2d 973, 154 USPQ 92 (1967)] and In re Chilowsky [43 CCPA 775, 229 F.2d 457, 108 USPQ 321 (1956)] which require consideration of the material which Applicant supplied and cited.

The Examiner ignores In re Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444 which requires the Examiner to substantively respond with a *prima facie* case of unpatentability. However, after the submission of Swartz(97), other peer-review papers, and the Declarations, the burden shifts back to the Office and can only discharged by the Examiner "presenting evidence or reasons why persons skilled-in-the-art would not recognize in the disclosure a description of the invention defined by the claims" [Wertheim, 541 F.2d at 263, 191 USPQ at 97]. Applicant asks that this be done with specificity, substantivity, and with explicit reference, and in detail with full findings of fact.

The Examiner ignores In re Brana and In re Eltgroth, 419 F.2d 918, 164 USPQ 221 (CCPA 1970) which demand that the Examiner must establish a reason to doubt an invention's asserted utility, and the two-stage process involving loading of hydrogen into a metal electrode such as palladium, and means to extract product using magnetic field inhomogeneity based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21] is not 'incredible' or 'unbelievable' like the Examiner appears to purport. This invention is quite believable.

110. In summary, Examiner must consider the submitted evidence including:

#1) Declarations from scientists of ordinary skill-in-the-art, who considered the specification and stated that the written description was sufficient.

#2) The published peer-reviewed scientific articles [including Swartz(92, 94A, 97A, 97C, 98A, and 98B)].

The Examiner ignores In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) which indicates that #1 or #2 are sufficient to demonstrate that the specification provides an adequately written description of the subject matter, including how to operate the invention, and claimed the invention so that an artisan, or those skilled-in-the-art, could practice it without undue experimentation. Either #1 or #2 prove that enablement, utility, and validation. Together, #1 and #2 have been submitted and Applicant submits that these together corroborate enablement of the present invention both *de facto* and *de jure*.

111. The Examiner has failed to comment on the fact that energy is a Major Financial Sector of the US economy, and even more important during War. The Examiner cannot honestly admit there is no utility for an invention measuring energy-production and efficiency.

The Examiner ignores In re Vaeck [947 F.2d 488, 495-96, 10 USPQ2d 1438, 1444 (Fed. Cir. 1991)] which states that an enablement rejection under section 112,¶1 is only appropriate where the written description fails to teach those skilled-in-the-art, like the Declarants, to make and use the invention.

The Examiner has ignored controlling authorities including Clause 8 of Section 8, Article I, by improperly eliminating an entire field involving energy and United States security.

The Examiner has ignored controlling authorities including Article VI, by interfering laws passed by Congress [DIAMOND v. CHAKRABARTY; 447 U.S. 303, 309] including that patentable statutory subject matter spans "anything under the sun that is made by man" [S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H. R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952)].

The Examiner has ignored controlling authorities including Article I, Section 2, by ignoring that Applicant is entitled to the privileges and immunities of citizens in the other states. Specifically, the Examiner ignores that the Office, Europe and Japan have allowed selected other patents in the very same field not allowed here [Czirr(5,231,290), Westphal(5,215,631), Ahern(5,411,654), Patterson(5,036,031), (5,318,675), (5,372,688), (5,036,031); Aspden, UK-GB 2,231,195B]. This is a dual-tiered system.

112. In addition, no such demand was made of the cited patents. There appear to be two different standards of review. Therefore, the Examiner has ignored controlling authorities including the reasoning of the Supreme Court in United States v. Nixon (1974) that all are "equal under the law". Hence, the Examiner has ignored controlling authorities including the 14th Amendment, requiring an impartial tribunal [28 U.S. Code Section 144, Mayberry v. Penna., 91 S.8.; Bloom v. Illinois, 88 Ct. 499 S.Ct. 1477; Duncan v. Louisiana, 88 S.Ct.1444] and equal protection. In the light of the previously unrebutted Declarations [hereby again submitted] there appear to be violations of the 14th Amendment's "equal protection" clause [Frontiero v. Richardson, 93 S.Ct. 1736, 411 U.S. 677; Weiss v. Weiss, 436 N.Y.S. 2d. 862, 52 N.Y. 2d. 170 (1981)] with serious implications [Gass v. Lopez, 95 S. Ct 729; Wood v. Strickland, 95 S Ct 9S2: U.S. v. Price, 86 S Ct 1152, 1157, Footnote 7; Griffin v. Breckenridge, 91 S Ct 179D; Gamez v. Toledo, 42 U.S.C.§1983, and Bivens v. Six Unknown Named Agents of Fed. Bureau of Narcotics].

SUMMARY RE: 35 USC 112

113. The Applicant taught the subject matter defined by each of the rejected Claims 1-10 and 12-19 (all pending claims) including how his apparatus and method works, set forth the best mode contemplated, distinctly pointed out and claimed the subject matter which constitutes the invention, wrote an adequate enabling disclosure, and thus complied and conformed with 35U.S.C.§112, first paragraph, of the Patent Act.

Furthermore, the two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities was presented in the original specification and claims so that an artisan, or those skilled in the art, could practice it without undue experimentation [In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988), citing with approval Ex parte Forman, 230 USPQ 546, 547 (Bd. Pat. App. & Int. 1986)]. Applicant has now demonstrated that his invention as claimed was, and is, adequately described to one skilled-in-the-art. Said Declarations are sufficient in their factual content with respect to the significant evidence, and prove that the Examiner is in clear error. By submitting said peer-reviewed publications, showing the Applicant is correct, and said Declarations containing relevant facts by probative witnesses, the Applicant has now undertaken the full burden coming forward with his evidence as required [In re Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444].

The Claims clearly define subject matter of considerable utility because energy needs dominate the economy.

The Examiner's communication contains copious material misstatements, including those corrected by the Office's own witnesses.

The Examiner's communication ignores the standards of review and the Office's own rules.

The Examiner's communication has not discussed the invention as it was actually taught, but is cut of a cloth other than this invention which demonstrates that the Office's notions are quite weak, heralding the need for allowance of the present invention.

The Examiner should closely consider and accept the testimony of the Declarants, skilled-in-the-art, who dispute the Examiner and attest to conformation with 35U.S.C.§101.

The Examiner should closely consider Swartz(97) and the other relevant peer-reviewed publications which demonstrate enablement at the time of the initial filing because validation only comes through peer-review.

In accordance with the foregoing arguments that Applicant has conformed with the requirements of sections 112 of the Patent Act, and reversal of the rejection of the Claims 1-10 and 12-19 is respectfully requested, as required by the statute (35 USC 112).

DISCUSSION OF 35 USC 101 REJECTION

114. Claims 1-10 and 12-19 are rejected under 35 U.S.C. 101 because the claimed invention as disclosed, in the erroneous opinion of the Office, is inoperative and therefore lacks utility. Applicant disputes this for the reasons below which are supported by facts and Declarants and peer-reviewed published papers.

The Office states,

"The invention is not considered .... "useful". Note in this respect, Page A1 4 of the 7113/89 edition of The Washington Post which indicates that there is no convincing evidence that the "phenomena attributed to cold fusion would produce useful sources of energy".

THE TRUTH - THOSE SKILLED-IN-THE-ART SAY THERE IS UTILITY

Proof of utility should be judged either by those using the invention or those skilled in the art. Therefore, the Examiner must consider those skilled-in-the-art who oppose and counter the rejection under 35U.S.C.§101. The Examiner points to out art not involving this Application. However, validation occurs when scientists actually skilled, and working, in the state-of-the-art state it to be so. These scientists write the current scientific technical papers which undergo peer-review, file patent applications, and attend international conferences (which have gone on for thirteen years) and they absolutely disagree with the Examiner.

DECLARATIONS AND OTHER TESTIMONY SUPPORT UTILITY

115. The Examiner is incorrect and absolutely and substantively contradicted Drs. Chubb, Fox, Mallove, McKubre, and by the Office's own previous witnesses, Dr. Rehn and Dr. Will.

At the seventh international meeting in this field. Dr. McKubre stated:

"For me, the best heat report, and perhaps the best report at this conference, was that of Mitch Swartz. ... I have not been able to perform the experiments myself, successfully, and I have always felt that the quality of the calorimetric observations in the nickel light water studies has been less than the quality of the calorimetric observations in the palladium-detuerium system. ... Mitch Swartz presented a very clear piece of calorimetric evidence which is cerainly going to cause me to reconsider my belief and understanding of the nickel-light water system and its capacity to produce anomalous heat"

[Dr. Michael McKubre, SRI, *Infinite Energy*, 4, 20 , pp.34-35, (1998)]

Dr. Michael Schaffer (A55, 8/7/01) said,"I do not see how anyone could construe anything that I wrote at Scientific American's site to imply that there is "no utility" in cold fusion, much less in instruments that might be used in cold fusion and other scientific experiments. ... As an expert ... I would agree [Dr. Swartz's invention] ... does have utility".

Dr. Rehn, U.S. Navy, said "Perhaps the clearest scientific fact, at this time, is the hardest for physicists to accept: nuclear reactions apparently do occur in deuterium-loaded Pd, Ti, and probably in other solids." [Office of Naval Research Asian Office, NAVSO P-3580, Vol. 18, Jan. 1993]. This confirms that Dr. Will said, "Significant positive results have been obtained (by) 100 groups from more than 12 countries" [Final Report NCFI (1991)].

116. Utility is a fact question, and proof of utility is sufficient <u>if it meets at least one stated objective</u>. Here it does. The Examiner has not followed the standards of review. The Office's rule [M.P.E.P. §2111.01] requires that "the words of a claim ... must be read as they would be interpreted by those of ordinary skill in the art.".

LAW

117. Utility is a fact question, and proof of utility is sufficient if it is convincing to one of ordinary skill in the art or if it meets at least one stated objective.

"Utility is a fact question, see e.g., Wilden Pump v. Pressed & Welded Products Co, 655 F.2d 984, 988, 213 USPQ 282, 285 (9th Cir. 1981); Nickola v. Peterson, 580 F.2d 898, 911, 198 USPQ 385, 399 (6th Cir. 1978), cert. denied, 440 U.S. 961, 99 S.Ct. 1504, 59 L.Ed.2d 774 (1979)." ***

"When a properly claimed invention meets at least one stated objective, utility under 101 is clearly shown. See e.g., Standard Oil Co. (Indiana) v. Montedison, S.P.A., 664 F.2d 356, 375, 212 USPQ 327, 344 (3rd Cir. 1981), cert. denied, 456 U.S. 915, 102 S.Ct. 1769, 72 L.Ed.2d 174 (1982); E.I. du Pont de Nemours & Co. v. Berkley & Co., 620 F.2d 1247, 1258 n. 10, 1260 n. 17, 205 USPQ 1, 8 n. 10, 10 n. 17 (8th Cir.1980); Krantz and Croix v. Olin, 148 USPQ 659, 661-62 (CCPA 1966); Chisum on Patents, 4.04[4] [1983]."

[RAYTHEON COMPANY v. ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592]]

"Proof of utility is sufficient if it is convincing to one of ordinary skill in the art. In re Irons, 52 CCPA 938, 340 F.2d 974, 144 USPQ 351 (1965). The amount of evidence required depends on the facts of each individual case. In re Gazave, 54 CCPA 1524, 379 F.2d 973, 154 USPQ 92 (1967). The character and amount of evidence needed may vary, depending on whether the alleged utility appears to accord with or to contravene established scientific principles and beliefs. In re Chilowsky, 43 CCPA 775, 229 F.2d 457, 108 USPQ 321 (1956)."

[In Re JOLLES, U.S.C.P.A., 1980. 628 F.2d 1322, 206 USPQ 885]

The Declarations demonstrate that the original specification and claims clearly define subject matter of considerable utility. Therefore, the Applicant has fully conformed with, and satisfied, the requirements of §101 of the Patent Act and met at least one (1) stated objective [Standard Oil Co. (Indiana) v.Montedison, S.P.A., 664 F.2d 356, 375, 212 USPQ 327, 344 (3rd Cir. 1981), cert. denied, 456 U.S. 915, 102 S.Ct. 1769, 72 L.Ed.2d 174 (1982); E.I. du Pont de Nemours & Co. v.Berkley & Co.,620F.2d1247,1258 n.10,1260 n17,205 USPQ1,8n10,10n.17(8th Cir.1980); Krantz and Croix v.Olin, 148 USPQ 659, 661-62 (CCPA 1966); Chisum on Patents, 4.04[4] [1983]; RAYTHEON COMPANY v.ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592].

The Examiner has rejected In re Zurko [142 F.3d 1447, 1449, 46 USPQ2d 1691, 1693 (Fed. Cir.), cert. granted, 119 S. Ct. 401 (1998)] which declares that utility is a fact question [RAYTHEON COMPANY v.ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592], and one which the Examiner in this case must review for clear error [Cross v.Iizuka, 753 F.2d 1040, 1044 n.7, 224 USPQ 739, 742 n.7 (Fed. Cir. 1985); also In re Zurko].

118. The Examiner has rejected the directive of 1.131 (a)(1) which requires that "When ... a patent ... is rejected .... on reference ... to a printed publication, the inventor of the subject matter of the rejected claim ... may submit an appropriate oath or declaration to overcome the patent or publication." Unrebutted Declarations have been submitted in this case, and are again submitted, and the Examiner must respond to them substantively [Marino v. Hyatt Corporation; Morrill v. Tong; and Chelebda v.H.E. Fortuna & Brothers Inch].

In re Irons indicates that utility is a fact question [RAYTHEON COMPANY v. ROPER CORPORATION]. The submitted Declarations and the publications (including e.g. McKubre) are relevant as proof of utility. They demonstrate utility and operability at the time of the filing of this patent, and that it was, and is, important and of considerable utility.

The Examiner has rejected In re Ziegler [992 F.2d 1197, 1200, 26 USPQ2d 1600, 1603 (Fed. Cir. 1993)] which requires the Examiner accept Declarations as factual proof of utility.

The Examiner has rejected Marino v.Hyatt Corporation, 793 F.2d 427, 430 (1st Cir. 1986); Morrill v.Tong, 390 Mass. 1207 129 (1983); Chelebda v.H.E. Fortuna & Brothers Inch 609 F.2d 1022 (1st Cir. 1979); Lewis v. Bours, 119 Wn.2d 667, 670, 1992] which require the Examiner to assume that the Declarants' assertions are true.

The Examiner has rejected In re Ferens [417 F.2d 1072, 1074, 163 USPQ 609,611 (CCPA 1969)] which heralds that Applicant's submitted evidence, including Declarations, is sufficient.

The Examiner has rejected Ex parte Porter which requires that Declarations, submitted in response to the Examiner's comments, must be read, examined, and carefully considered.

The Examiner has rejected In re Morris [127 F.3d 1048, 1053-56, 44 USPQ2d 1023, 1027-30 (Fed. Cir. 1997)] which demands that the interpretation of operability and utility is predicated upon that which one who is skilled-in-the-art would reach. The Examiner must given the claims their broadest reasonable interpretation consistent with that which those skilled-in-the-art would reach.

The Examiner has rejected In re Oetiker [977 F.2d at 1445, 24 USPQ2d at 1444] which requires the Examiner substantively and fully respond to the probative witnesses, because Applicant has undertaken the full burden coming forward.

The Examiner has rejected Ex parte Gray [10 USPQ2d 1922, 1928 (Bd. Pat. App. & Inter. 1989)] which allows for Applicant's submitted expert testimony regarding operability and utility, beyond the detailed specification. The Examiner must give substantial weight to said Declarations about what they said about this invention compared to the Examiner's art regarding the work of others.

The Examiner has rejected In re Brana, 51 F.3d at 1566, 34 USPQ2d at 1441] which indicates Applicant's actions hereby meet the "burden shift ... to provide rebuttal evidence sufficient to convince such a person of the invention's asserted utility".

The Examiner has rejected In re Marzocchi and In re Oetiker which require responsive argument to the fully addressed criticism against the Examiner's unfounded notions. In re Marzocchi, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971)] declares that the Examiner cannot make the rejection he has unless he has reason to doubt the objective truth of the statements contained in the written description, here corroborated and supported by multiple Declarations.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

Transformation for Inactive to Active is Patentable even without the Other Features

119. Utility is a fact question, and proof of utility is sufficient if it meets at least one stated objective. Here it does - means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21].

Furthermore, removal of product AND a two stage system involve transformation of a state or thing. Therefore, the Examiner has not followed the standards of review because such a two state method should be patentable based upon opinion of the Court.

"Transformation and reduction of an article "to a different state or thing" is the clue to the patentability of a process claim that does not include particular machines."

[Gottschalk v. Benson, 409 U.S. 63 (1972),
409 U.S. 63, No. 71-485]

"Industrial processes such as this ["a physical and chemical process (which involves) the transformation of an article .... into a different state or thing"] are the types which have historically been eligible to receive the protection of our patent laws. [450 U.S. 175, 185]"

[Diamond v. Diehr, 450 U.S. 175 (1981)]

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

The Examiner Ignores Constitutional and Congressional Directive

120. The Examiner has rejected the controlling authority of Art. I, §8, cl. 8 which provides that "Congress shall have Power (t)o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries". Art. I, §8, cl. 8 empowers Congress in this matter.

The Examiner has rejected that the US Congress has mandated progress.

"The patent laws (reflect) this Nation's deep-seated .... need to encourage progress."

[Diamond v. Chakrabarty, 447 U.S. 303 (1980),
447 U.S. 303, No. 79-136]

The Examiner has rejected that the US Congress has mandated encouragement of science, and the Office's actions are inconsistent with the Patent Act of 1793, authored by Thomas Jefferson, which defined statutory subject matter as "any new and useful art, machine, manufacture, or composition of matter" Act of Feb. 21, 1793, 1, 1 Stat. 319, and with the Act which embodied Jefferson's philosophy that "ingenuity should receive a liberal encouragement." [447 U.S. 303, 309].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

The Examiner Mistakes a Question of Fact for a Question of Law?

121. The Examiner dismisses the invention as opinion. However, Declarants' statements and the peer-reviewed publications are Fact. Exactly how many Declarants does it take to overcome the Examiner's unsubstantiated rejection?

The Examiner has mistaken a question of fact for a question of law. The Examiner cannot dismiss Declarations improperly to "opinion"-status without an adequate explanation of how the Declarations failed to overcome the *prima facie* case initially established by the Examiner.

The Examiner has rejected In re Alton which requires that even the use of the words "it is my opinion" to preface what someone of ordinary skill in the art knows does not transform the factual statements contained in the declaration into opinion testimony.

122. Utility is a fact question, and proof of utility is sufficient if it is convincing to one of ordinary skill in the art or if it meets at least one stated objective. In this case, the invention is convincing to several of ordinary skill in the art and have stated so at public meetings and the invention meets several stated objectives.

The invention (structure, operation and composition) is defined by the claims and the original specification, and in this case they correctly define the invention, and it the teachings have been corroborated, and therefore there is enablement (a question of law; In re Fouche, 439 F.2d 1237, 1243, 169 USPQ 429, 434, (CCPA 1971)). Enablement, utility, and operability are grounds for patentability.

In this case, the Applicant has set forth products and methods which have undergone peer-review, and as such do present utility within the meaning of 35 U.S.C. 101 [Brenner v. Manson, 148 U.S.P.Q. 689].

In this case, given the above, and the following, utility under 101 is clearly shown. Given the utility Applicant respectfully requests reconsideration of the rejection pursuant to U.S.C. 101.

CONCLUSION

123. Applicant taught in the original specification and claims how his apparatus works and claimed the invention.

Applicant has made a diligent effort to amend the claims of this application so that the claims define a novel structure which is also submitted to render said claimed structure unobvious because it produces new and unexpected results.

The applicant submits that any combination of Westfall, Patterson, Kinsella, or Furuya with Lasche or Wooley is an improper one, absent any showing in the references themselves that they can or should be so combined. Neither of the references appears to suggests, or allude to, or teach a structure as defined by Claims 1-10 and 12-19.

It appears that the figures and claims of Westfall, Patterson, Kinsella, or Furuya are intended to, and do, serve a different purpose than does the structure defined by the claims, and Lasch, and Wooley adds nothing of substance.

None of the references shows the two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

None of the references shows these features.

Based upon the facts cited here, these Claims 1-10 and 12-19 are patentable over the cited references because the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and the physical distinctions effect new and unexpected results, thereby indicating that the physical distinction is simply not obvious [Sec. 103].

124. As the original specification and claims teach, the invention solves the long-standing problem of controlling hydrogen flow in metals and extracting product using magnetic field inhomogeneity based differential magnetic susceptibilities - features of great utility. The Examiner should admit that said features are not "incredible" but can be elicited when using the teachings of the original specification and claims. Furthermore, there is documented existence of these reactions and the preferred environment in which the present invention does operate. The number of

papers in this field confirms both the "existence" and "utility" of these phenomena and any associated technologies.

125. If the Examiner disagrees, the Applicant requests specificity as to the reason to facilitate Appeal. Specifically, Applicant requests that Examiner makes clear in the record which of these submitted averments by the Declarants regarding operability and utility were formally considered, and if the Examiner disputes them, exactly how he will have reached his conclusion. If the Examiner dismisses, ignores, or relegates improperly to "opinion"-status, any or all of the submitted Declarations, the Applicant hereby explicitly requests an adequate explanation of how the Declarations failed to overcome the *prima facie* case initially established by the Examiner. If the Examiner has anything which differs or rebuts anything in the original specification and claims -- or the Declarations and Exhibits, Applicant requests it is stated explicitly pointing to where in Applicant's publications or applications said rebuttal relates with specificity.

Request For Constructive Assistance

126. If, for any reason the claims of this application are not believed to be in full condition for allowance, the applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims [pursuant to MPEP 707.07(j)] or in making constructive suggestions [pursuant to MPEP 706.03(d)] in order that this application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Applicant notes that the U.S. Supreme Court has ruled that any *pro se* litigant is entitled to less stringent standards [U.S. Rep volume 404, pages 520-521 (72)].

WHEREFORE for the above reasons, including Declarations and the peer-reviewed published papers, the Applicant respectfully requests reconsideration and reversal of the Examiner's rejections of

Claims 1-7, 10, and 13-16 rejected under 35 U.S.C. 102 (b), as being anticipated by Westfall, Claims 1-9 and 13-19 as being anticipated by Furuya, Claims 1-8, and 13-16 as being anticipated by Patterson, Claims 1-7 and 13-16 as being anticipated by Swartz,

Claims 1, 2, 4, 5, 7, 10, 13, 15 and 16 rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella,

Claims 10 and 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya in view of either Lasche or Wooley,

Claims 1-10 and 12-19 rejected under 35 U.S.C. 112 and 35 U.S.C. 101 by the Examiner, based upon flawed reference to other art ("FP" or "F+P"),

as is just and reasonable, or to address each matters of law and errors of fact cited herein.

Respectfully,

Mitchell R. Swartz, ScD, MD, EE
16 Pembroke Rd., Weston, MA 02493

Certificate Of Mailing [37 CFR 1.8(a)]

October 22, 2002

To Whom it Does Concern:
I hereby certify that this correspondence will be deposited with the United States Postal Service by First Class Mail, postage prepaid, in an envelope addressed to

"The Commissioner of Patents and Trademarks
Washington, D.C. 20231" on the date below.
Thank you.

Sincerely,

October 22, 2002

M.R. Swartz
16 Pembroke Rd. Weston, MA 02493

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Specification

U.S. PATENT DOCUMENTS on page 3 have been amended as follows:

U.S. PATENT DOCUMENTS
Serial number Filing Date
07/339,976 04/18/1989 Swartz, M.
07/371,937 06/27/1989 Swartz, M.
08/406,457 03/20/1995 Swartz, M.
09/573,381 05/19/2000 Swartz, M.

Paragraph 4, page 3, lines 17-25 has been amended as follows:

The present invention relates to electrochemical reactions in or about metals, such as palladium which has been electrochemically loaded with deuterium, but it has relevance as well, to hydrogen loading ~~storage, fuel cells~~, nuclear fusion, and other reactions in ~~pressure~~-loaded metals such as titanium or palladium filled with deuterium, and to the broader field of metallurgy and engineering in or about metals, including Groups IVb, Vb, and some rare earths.

[Corrected] The present invention relates to electrochemical reactions in or about metals, such as palladium which has been electrochemically loaded with deuterium, but it has relevance as well, to hydrogen loading, nuclear fusion, and other reactions in loaded metals such as titanium or palladium filled with deuterium, and to the broader field of metallurgy and engineering in or about metals, including Groups IVb, Vb, and some rare earths.

OTHER PUBLICATIONS listed on page 4 has been amended as follows:

J. O'M BOCKRIS, K.N. Reddy, "Modern Electrochemistry", Plenum Press (1970).
C. A. HAMPEL, Rare Metals Handbook, Reinhold Publishing Corp, (1954).
M. HANSEN, Constitution of Binary Alloys, McGraw-Hill Book Co., Inc. (1958).
J. R. MELCHER., "Continuum Electromechanics", MIT Press, Cambridge, (1981).
C. J. SMITHELLS, Metals Reference Book, Butterworths Scientific, (1949).
H. H. UHLIG, Corrosion and Corrosion Control, John Wiley & Sons, Inc., (1971).
M. SWARTZ, "Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal", *Fusion Technology*, 22, 2, 296-300 (1992).
M. SWARTZ, (1994A) "Isotopic Fuel Loading Coupled To Reactions At An Electrode", *Fusion Technology*, 26, 4T, 74-77.
M. SWARTZ, (1994B) "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "*Proceedings: "Fourth International Conference on Cold Fusion*", EPRI and Office of Naval Research.
M. SWARTZ, "A Method To Improve Algorithms Used To Detect Steady State Excess Enthalpy", *Transactions of Fusion Technology*, 26, 156-159 (1996).
M. SWARTZ, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74 (1997A).
M. SWARTZ., "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33 (1997B).
M. SWARTZ, "Codeposition Of Palladium And Deuterium", *Fusion Technology*, 32, 126-130, (1997C).
M. SWARTZ, Improved Electrolytic Reactor Performance Using π-Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 (1998A).
M. SWARTZ, "Patterns of Failure in Cold Fusion Experiments, Proceedings of the 33RD Intersociety Engineering Conference on Energy Conversion, IECEC-98-I229, Colorado Springs, CO, (1998B).
A. VON HIPPEL, "Dielectric Materials and Applications", MIT Press, (1954)
A. VON HIPPEL, D.B. Knoll, W.B. Westphal, "Transfer Of Protons Through 'Pure' Ice Ih Single Crystals", J. Chem. Phys., 54, 134, (also 145), (1971).

Page 10, paragraph 1, line 22 has been amended as follows:

The power supply and control unit consists of a current source and ~~FUSOR reactor control device~~ as described in Swartz (1989), and are not shown in the figure. For simplicity, the electrical connections, heat removing apparatus, and several improvements described in this disclosure are not shown in figure 1.

[Corrected] The power supply and control unit uses a current source as described in Swartz (1989), and are not shown in the figure. For simplicity, the electrical connections, heat removing apparatus, and several improvements described in this disclosure are not shown in figure 1.

Page 11 line 6 has been amended as follows:

Therefore, a quasi-1-dimensional model can be used to describe the situation external to the cathode [SWARTZ, M., 1992, "Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal", Fusion Technology, 22, 2, 296-300; SWARTZ, M., 1994A, "Isotopic Fuel Loading Coupled To Reactions At An Electrode", Fusion Technology, 26, 4T, 74-77; SWARTZ, M., 1997C, "Codeposition Of Palladium And Deuterium", Fusion Technology, 32, 126-130 (1997)].

[Corrected] Therefore, a quasi-1-dimensional model can be used to describe the situation external to the cathode [SWARTZ, M., 1992, "Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal", Fusion Technology, 22, 2, 296-300; SWARTZ, M., 1994A, "Isotopic Fuel Loading Coupled To Reactions At An Electrode", Fusion Technology, 26, 4T, 74-77; SWARTZ, M., 1997C, "Codeposition Of Palladium And Deuterium", Fusion Technology, 32, 126-130 (1997)].

Page 11 line 15 has been amended as follows:

B is the diffusivity of the isotopic fuel loaded into the material. I, A and F are the electrical current, area, and the Faraday. [$D^{\pm}$] is spatially and time variant.

[Corrected] B is the diffusivity of the isotopic fuel loaded into the material. I, A and F are the electrical current, area, and the Faraday. [D^{+}] is spatially and time variant.

Page 13 line 26 has been amended as follows:

This occurs until, by a second catastrophic process, the fusion-defect-site is no longer confined [Swartz. M., 1994B, "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "*Proceedings: "Fourth International Conference on Cold Fusion*", EPRI and Office of Naval Research; Swartz, M., 1997B, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33].

[Corrected] This occurs until, by a second catastrophic process, the fusion-defect-site is no longer confined [Swartz. M., 1994B, "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "*Proceedings: "Fourth International Conference on Cold Fusion*", EPRI and Office of Naval Research; Swartz, M., 1997B, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33].

Page 20 lines 9-11 have been amended as follows:

The calculated fugacities involved are enormous ranging from 5000 up to an estimated 10^7 atmospheres for hydrogenated palladium [Bockris].

[Corrected] The calculated fugacities involved are enormous ranging from 5000 up to an estimated 10^7 atmospheres for hydrogenated palladium [Bockris].

Page 21 line 12-16 have been amended as follows:

This type of system, coupled with the FUSOR (JET Energy Technology, Wellesley Hills ~~Weston~~, MA) drive system or its equivalent [Application '976; Swartz, M., 1997A, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74; Swartz, M., 1998A, Improved Electrolytic Reactor Performance Using π-Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85], is capable of filling the cathode with deuterium from the solution. However, the deuterated metals could also be filled by codeposition of deuterium and palladium, or by high pressure deuterium gas.

[Corrected] This type of system, coupled with the FUSOR (JET Energy Technology, Wellesley Hills, MA) drive system or its equivalent [Application '976; Swartz, M., 1997A, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74; Swartz, M., 1998A, Improved Electrolytic Reactor Performance Using π-Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85], is capable of filling the cathode with deuterium from the solution. However, the deuterated metals could also be filled by codeposition of deuterium and palladium, or by high pressure deuterium gas.

In The Claims

Claim 1 has been amended as follows:

1. In a process for producing a product using a material which is electrochemically loaded with an isotopic fuel, a method of controlling the loading which includes in combination:
~~supplying said isotopic fuel~~ into ~~said material,~~
~~providing means for~~ loading said isotopic fuel into said material ~~to saturate said material~~,
then providing means for producing a change in the ~~active~~ quantity of said isotopic fuel within said material,
creating thereby a catastrophic diffusion flux of said isotopic fuel within said material,
providing a diffusion barrier to said diffusion flux of said isotopic fuel within said material,
means thereby producing said product.

1.(Corrected) In a process for producing a product using a material which is electrochemically loaded with an isotopic fuel, a method of controlling the loading which includes in combination:
loading said isotopic fuel into said material,
then providing means for producing a change in the quantity of said isotopic fuel within said material,
creating thereby a catastrophic diffusion flux of said isotopic fuel within said material,
providing a diffusion barrier to said diffusion flux of said isotopic fuel within said material,
means thereby producing said product.

Claim 3 has been amended as follows:

3. (Amended) A method as in claim 1 wherein said ~~second material~~ **loaded isotopic fuel** is a member of the group consisting of deuterium or deuterons.

3. (Corrected) A method as in claim 1 wherein said loaded isotopic fuel is a member of the group consisting of deuterium or deuterons.

Claim 4 has been amended as follows:

4. (Amended) In a process using an isotopic fuel loaded into a material, a two-stage method for controlling the loading which includes in combination:

~~supplying said isotopic fuel~~ into ~~said material,~~

~~providing means for~~ loading said isotopic fuel into said material ~~to saturate said material~~,

then providing means for producing a change in the ~~active~~ quantity of said isotopic fuel within said material,

creating thereby a catastrophic diffusion flux of said isotopic fuel within said material.

4. (Corrected) In a process using an isotopic fuel loaded into a material, a two-stage method for controlling the loading which includes in combination:

loading said isotopic fuel into said material,

then providing means for producing a change in the quantity of said isotopic fuel within said material,

creating thereby a catastrophic diffusion flux of said isotopic fuel within said material.

Claim 6 has been amended as follows:

6. (Amended) A method as in claim 4 wherein ~~second material~~ loaded isotopic fuel is a member of the group consisting of deuterium or deuterons.

6. (Corrected) A method as in claim 4 wherein loaded isotopic fuel is a member of the group consisting of deuterium or deuterons.

Claim 8 has been amended as follows:

8. (Amended) A method as in claim 4, where the said means to produce a change in the ~~active~~ quantity of said isotopic fuel within said material is by a change in temperature of said material.

Claim 12 has been amended as follows:

12. (Amended) A method as in claim 10 wherein said means of removing said product utilizes an applied spatially inhomogeneous magnetic field.

12. (Corrected) A method as in claim 10 wherein said means of removing said product utilizes an applied spatially inhomogeneous magnetic field.

Claim 13 has been amended as follows:

13. (Amended) An apparatus to produce a product using a material loaded with an isotopic fuel, which includes in combination:

means to supply said isotopic fuel to said material,

means to load said isotopic fuel into said material to saturate said material,

means to produce a change in the active quantity of said isotopic fuel within said material,

means thereby to produce a catastrophic diffusion flux of said isotopic fuel within said material,

means thereby to produce said product.

13. (Corrected) An apparatus to produce a product using a material loaded with an isotopic fuel, which includes in combination:

means to load said isotopic fuel into said material,

means to produce a change in the quantity of said isotopic fuel within said material,

means to produce a catastrophic diffusion flux of said isotopic fuel within said material,

means thereby to produce said product.

Claim 19 has been amended as follows:

19. (Amended) An apparatus as in claim 13 wherein the means produce a change in the ~~active~~ quantity of said isotopic fuel within said material is by a change in temperature.

19. (Corrected) An apparatus as in claim 13 wherein the means produce a change in the quantity of said isotopic fuel within said material is by a change in temperature.

Claims 21 and 22 have been added as follows:

21. A method as in claim 1, where the additional step is taken of removing said product produced.

22. A method as in claim 21 wherein said means of removing said product utilizes an applied spatially inhomogeneous magnetic field.